THE IRON TRADE REVIEW

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PEACE EFFORTS

WILL MEET THE APPROVAL OF THE COUNTRY.

Although Some Prefer to Fight—Importance of the Hill Ore Lands Deal—Continued Active Demand for Finished Materials.

News of the past few days concerning the threatened coal strike, although somewhat conflicting, has given much reason for hoping that there will be no cessation of mining in either the anthracite or bituminous regions. While the active interest of the President of the United States and other powerful influences will, undoubtedly, be regretted by some who have believed that no concessions should be made to the miners, the overwhelming sentiment of the country will heartily endorse the efforts which have been made to prevent industrial war.

The Hill Ore Properties. The announcement of agreement upon the principal features of the deal, which has long been pending between the United States Steel Corporation and James J. Hill, for the control of his great ore deposits on the Mesabi range in the Lake Superior district, lacks official confirmation, but comes from a reliable source. The contract is highly important, and shows not only the foresight of Mr. Hill in getting possession of these ore lands, but also the wisdom of officials of the Steel Corporation in arranging for a lease by which they will have control of the lands for thirty years; and will be able, if they so desire, to mine the entire deposits, estimated at 300,000,000 tons, during that period. Under the terms of the contract, it will not be necessary for the Corporation to mine a very large amount every year. Whether it will do so will depend upon conditions in the future, but it is not improbable that a considerable part of the tonnage mined by the Corporation hereafter will come from the Hill property, which policy would enable it to postpone many years the exhaustion of the deposits which it has heretofore held. It is understood that the question whether the quality of the ore is to be guaranteed has not been agreed upon.

Pig Iron Is Quiet. The pig iron market continues to be quiet, and is dull in some places, particularly in southern iron, although very heavy shipments have been made from the south during the week, on account of the advance of 25 cents per ton in freight rates, effective March 1. The absence of heavy buying, during the past two or three weeks, is not regarded with alarm by furnace interests, which consider it a natural sequence of the very heavy buying of December and January. All iron consuming interests are busy, and there is abundant reason for expecting much greater activity in buying at a not far distant date. It is confidently believed that the Steel Corporation will continue to contract for heavy tonnages of Bessemer.

Heavy Specifying. Specifications on sheet contracts are very heavy, and mills are running up to their full capacity, so far as the supply of semi-finished material will permit. The demand for structural material continues strong. The American Bridge Co., during February made contracts amounting to 60,000 tons, and other interests enjoyed excellent business. The demand for wire and wire nails is very active, and it is predicted that there will be a shortage in the spring.

Prices are Reaffirmed. At the meeting held in New York, prices on plates and shapes were reaffirmed. Mills are able to give more satisfactory delivery on plates, but, are, as a rule, well supplied with orders. Steel car manufacturers and other users of merchant steel are specifying heavily. Sales of rails continue in fair volume, those of the past week amounting to about 32,000 tons by the leading interest, of which 11,500 tons went to the 'Frisco system, and most of the remainder to traction lines.

OPERATORS TO MEET.

Conference Called To Discuss Strike.—In Deference to President.

(Special Telegram.)

Pittsburg, Feb. 28.—A convention of coal operators has been called for March 19. The following call was issued Wednesday afternoon:

"Address to the operators of Western Pennsylvania, Ohio, Indiana and Illinois:

"In view of the suggestion made by the president of the United States that an effort be made to adjust the differences now existing between the bituminous operators and the miners of Western Pennsylvania, Ohio, Indiana and Illinois, we, the undersigned operators, acting in our individual capacity, request that all of the operators of these four states assemble for conference at the Claypool Hotel in Indianapolis, Ind., Monday, March 19, at 10 a. m.

Francis L. Robbins.
John H. Jones.
George A. Magoon.
J. H. Winder.
F. M. Osborne.
H. L. Chapman.
T. E. Young.
George H. Hornikel.
J. T. Kolsen.
J. K. Seifert.
A. M. Ogle.
Hugh Shirkie.
J. H. McClelland.
H. N. Taylor.
B. F. Bush.
R. R. Hammond.
O. L. Garrison.

In issuing a request for a conference of the coal operators of the four states of Western Pennsylvania, Ohio, Indiana and Illinois, it is positively stated by all the operators joining in this call that said meeting has been called entirely in deference to the wishes of the president of the United States and that no action has been taken or agreement of any kind has been made by any operator up to this date regarding any possible settlement of existing differences. No settlement is possible on any terms until after such meeting has been held and the individual views of all the operators of the four states has been obtained.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Increase in New Business in Finished Lines.—Shafting Makers Meet.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, February 28.

The condition of the local iron and steel market has changed but little since last week with the exception that there is a little easier feeling on account of the later developments regarding the possibility of a strike in the soft coal regions. The announcement that the miners will reconvene their convention and that the operators will again assemble to discuss the situation is taken as a favorable indication of a settlement without a strike. From some quarters it has been intimated that the United States Steel Corporation has had a great influence in this matter and has thrown this influence against an outbreak which would undoubtedly play havoc with the iron and steel industry of the country at this time when mills are running to capacity in order to supply the demand and deliveries are several months behind.

There has been an increase in new business in finished lines and the demand for structural shapes has been something enormous. Sheets and tin plate have also picked up and new contracts have been received in fair volume. There has been no advance in price of finished products, but a meeting of shafting makers will be held here today to organize and they will probably take some action on prices.

Although it was thought some time ago that most of the railroads had closed for about all the rails they would need for the year the new business in this line has been good and the electric traction companies have been heavy buyers. At a meeting in New York last week prices on plates and shapes were reaffirmed.

Pig Iron.—Consumers of pig iron are specifying very freely on their contracts and many have already anticipated their March requirements. From these favorable indications the furnaces are looking forward to a heavy buying movement to start before March 15 and it is anticipated that this movement will be considerable out of the ordinary from a tonnage standpoint. Prices on all grades of pig iron with the possible expection of basic are very firm. A tonnage of about 8,000 tons was sold at a figure slightly above $17, valley, on basic and it has been reported that $17 could be shaded, but no actual transaction at a lower figure has been reported. Many of the furnaces have already sold up for first quarter and are not looking for new business, "simply standing," as one of them expressed it, "at the counter waiting for customers to come in."

Northern foundry is strong and is quoted at $17.25 valley, or $18.10 Pittsburg although a small offering was made at $18 Pittsburg, or equal to $17.15, valley. There is a strong inquiry for malleable iron in the western district, particularly at Chicago although this does not apply to the Pittsburg district. It is estimated by a good authority that 7,000 tons of Bessemer is the maximum to be had in the valleys or in hands of brokers for March delivery and for prompt delivery in small tonnages $17.75 is being secured. Gray forge is quoted at $16.50. Inquiry on foundry grades is good, but it does not include large tonnages. We quote:

Bessemer Valley	$17.50 to 17.75
Bessemer, Pittsburg	18.35 to 18.60
No. 1 Foundry, Pittsburg	18.50 to 19.00
No. 2 Foundry, Pittsburg	18.10 to 18.35
Gray Forge, Pittsburg	17.35 to 17.60
Basic, Valley	17.00 to 17.25
Basic, Pittsburg	17.85 to 18.10

Ferro-Manganese.—Within the past week a carload of ferro-managanese, foreign, 80 per cent, was sold at $155 per ton and this is about the market for prompt delivery. On orders for forward delivery, the latter part of June $85 has been quoted, and under $90 has been quoted for May delivery.

Billets.—A peculiar condition of affairs exists in regard to billets, one of the big producers having within the past two weeks been a buyer to a considerable extent. The leading producers are out of the market as far as new business is concerned and but one manufacturing concern has any to offer. There are some in the hands of brokers, but they are being closely held at high prices. On Bessemer billets $27.50 to $27.75 is quoted and on openhearth $28.50 to $29. Forging billets during the week, on a small lot, brought $32.50.

Skelp.—But little new business has been reported, although mills are pretty well filled up on old contracts. On the ordinary guages we quote:

Bessemer grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; basic, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; iron skelp, grooved, 1.65c to 1.70c; sheared, 1.80c.

Muck Bar.—Muck bar by local producers is held at about $31 although this could probably be shaded on a firm offer of new business.

Rods.—As has been the case for quite a long time, the leading producers are out of the market, the exceedingly strong demand for finished material making it necessary for mills to use all rods produced for their own finishing mills.

Hoops and Bands.—There has been considerable inquiry from the south as to when the cotton tie market will open, but the producers have not yet opened their books for this class of business and do not expect to do so much before April 1. No idea as to the price has been given. New tonnage for hoops and bands has been good at the advance, although the leading consumers were pretty well taken care of on contract before the advance. We quote: Hoops, 1.90c in carload lots, and 2c on less than carload lots, bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Merchant Steel.—Specifications are very heavy and demand for delivery strong. The makers of agricultural implements have about closed their contracts for this season's business, but specifications are still coming in from them and, as is almost always the case, they are expected to come in later in the season for a considerable tonnage, if prospects for heavy crops are favorable. The steel car manufacturers are specifying heavily against their contracts, but new business is not in proportion to shipments being made. We continue to quote:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; openhearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch 1.65c base half extra tire list. Iron finished tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base, half extra steel card.

Rails and Track Material.—The leading interest during the week closed contracts for about 18,000 tons of standard sections. Of this 11,600 tons went to the 'Frisco system, and practically the whole remainder to electric traction companies. The inquiry is good and about equally divided between steam and electric roads. There is an excellent demand for light rails and the market is firm at prices quoted. We quote:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload

lots, $32; light rails, 16 pounds, $30; 20 pounds, $28.50 to $29; 25 to 45 pounds, $28; angle bars for standard sections, 1.50c; spikes, $2.05 to $2.10.

Structural Material.—At a meeting in New York last week the prices on plates and shapes were reaffirmed, conditions in the plate market not warranting an increase and shapes were taken care of at the time an advance was made about six months ago. Specifications on old commitments are very strong for structural material although there has been a little halt in new contracts on account of the feeling in some quarters that there is going to be a soft coal strike, but with the more recent developments this fear will undoubtedly be obviated and heavy new business is expected to take care of the imense building movement which is on in all parts of the country. We quote:

Beams and channels, 15 in., and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from 3 to 6 inches, inclusive. 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches, and wider, 1.60c base.

Plates.—Prices were reaffirmed at the New York meeting last week. New business has not been particularly good and mills are catching up on delivery and shipment within a month, and in some cases within two weeks, is now promised. We quote:

Tank plate ¼ inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill, Pittsburg. Extras are as follows per 100 pounds, boiler and flange steel plates, .10c; A. B. M. A. and ordinary firebox steel plates, .20c; still bottom steel, .30c; marine steel, .40c; locomotive firebox steel, .50c; all sketches excepting straight taper plates, varying not more than 4 inches, in width at ends, narrowest end not being less than 30 inches, .10c; complete circles, .20c. Plates in width over 100 inches up to 110 inches, .05c; over 110 inches up to 115 inches, .10c; over 115 inches up to 120 inches, .15c; over 120 inches up to 125 inches, .25c; over 125 inches, up to 130 inches, .50c; over 130 inches, 1.00c. Gauges under ¼ inch to and including 3-16 inch plates on thin edges, .10c; under 3-16 inch to and including No. 8, .15c; under No. 8 to and including No. 9, .25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—New business during the past week has shown a considerable increase and the demand against old contracts has been tremendous. This condition has not been confined to any particular districts or parts of the country, but has been general. Mills are running to capacity as far as the supply of semi-finished material will permit and in this direction the supply has materially improved within the past two or three weeks. We quote:

Black steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 2c; Nos. 13-14, 2.05c; Nos. 15-16, 2.10c; Nos. 17-21, 2.15c; Nos. 22-24, 2.20c; Nos. 25-26, 2.25c; No. 27, 2.30c; No. 28, 2.40c. Galvanized, Nos. 10-11, 2.35c; Nos. 12-14, 2.45c; Nos. 15-16, 2.55c; Nos. 17-21, 2.70c; Nos. 22-24, 2.85c; Nos. 25-26, 3.05c; No. 27, 3.25c; No. 28, 3.45c. Corrugated roofings, 1.70c per square for No. 28 painted, 2½-inch corrugation; 3.05c per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b. Pittsburg on large lots.

Tin Plate.—There has been no change in prices or conditions, although there has been a considerable increase in new business. The demand for delivery on old contracts is extremely heavy and shipments so far this year have been in excess to previous records in many instances.

We quote: $3.50 per base box, f. o. b. Pittsburg, 14 x 20 100-pound cokes, terms 30 days, less two per cent off for cash in 10 days. Some mills allow a 5c per box rebate on this price to the large trade.

Merchant Pipe.—The demand for pipe remains steady at about the point it has been for several months and makers have not been able to increase their stocks as is customary to a certain extent at this time of the year. During the past week there has been a little pick up in oil country goods, but whether this is due to a resumption of operations in the oil fields or simply a bunching of orders is a question. The 50 miles of pipe for the Union Oil Co., which will lay it across the Isthmus of Panama has already been shipped and is on its way to Panama. We continue to quote pipe, consumers' carloads as follows, with jobbers' carloads one point higher discount:

	Steel		Iron	
Consumer's Carloads	Black	Galv.	Black	Galv.
⅛ and ¼ inch	71	55	67½	51½
⅜ inch	73	59	69½	55½
½ inch	75	63	71½	59½
¾ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55½
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48½
½ to 4 inches	71	59	67½	55½
4½ to 8 inches	67	55	63½	51½
Double extra strong plain ends, ⅛ to 8 inches	60	49	56½	45½

Boiler Tubes.—On merchant boiler tubes, 22 feet and under, consumers' carloads, we quote as follows:

	Steel	Iron
1 to 1¼ inches	46	41
1¾ to 2¼ inches	58	41
2½ inches	60	46
2¾ to 5 inches	66	53
6 to 13 inches	58	41

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Wire and Wire Nails.—This market continues extremely active and mills are running to capacity on current shipments, producers being unable to accumulate their customary stocks at this time of the year. We quote:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carload lots, $2; painted barb wire, $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing; plain wire $1.70 to jobbers and $1.75 by carload.

Old Material.—The scrap situation is in no way improved and a still further slump in prices is looked for. Buyers are covering for actual needs only and have refused to lay in stocks at the ruling prices, prefering to await the decline which they predict will come before scrap is on a parity with pig iron for melting purposes. We quote: Heavy melting stock, $15.75 to $16; old steel rails, long lengths, $17 to $17.50; No. 1 cast scrap, $15.50 to $15.75; cast scrap borings, $9.50 to $9.75; bundled sheet scrap, $14 to $14.50; No. 1 railroad wrought scrap, $18 to $18.50; No. 1 yard faggotting scrap, $17.50 to $18.25; low phosphorus scrap, $19.50 to $20; wrought turnings, $12 to $13; busheling scrap, $14.50 to $14.75; iron axles, $25 to $26.

Coke.—The improvement which has been noticed for the past two weeks is still on an upward trend and better prices are being asked and secured. Some of the higher grades of foundry coke are held as high as $3.50 but for the standard grades of Connellsville foundry coke the market is between $2.85 and $3.10. Furnace coke is quoted at $2.35 to $2.50. Some of the furnaces, on the strength of the soft coal strike talk, have taken precaution to lay in a stock, but this will probably cease, for a time at least, on account of the latest movement of the operators and miners in agreeing to get together again and discuss the situation. The estimated total output of the Connellsville region was 365,203 tons of which the lower region produced 83,424 tons.

CHICAGO.

Offers of Southern at $14 More Numerous.—Bar Iron Weak.

Office of *The Iron Trade Review*,
1164 Monadnock Block, February 27.

Conditions in the local market remain substantially as they were a week ago. Pig iron continues soft, and $14 offers from southern furnaces are more plentiful than before. Bar iron is slow to gather strength, due in part to the continued weakness of the scrap market, and local prices have inclined to 1.70c. Specifications on plates to the local mill are coming forward slowly and new tonnage is also light. Merchant pipe is moving

freely, the demand being especially heavy for butt sizes. The scarcity of billets has become more pronounced here by the withdrawal of the Inland Steel Co. from the market for the next three months. Several thousand tons of billets have been sold to local consumers by eastern and southern manufacturers in the last few weeks, and it is expected that this trading will increase now that all the local mills are out of the market. Demand for wire products is of the heaviest proportions and mills are falling further behind in deliveries every week. A sharp advance in shafting is expected from the meeting of manufacturers of this product to be held in Pittsburg, Wednesday, the 28th. Present prices are 50 per cent from list for carload lots and 45 per cent for lesser lots, though these have not been firmly maintained for some time.

Pig Iron.—The refusal of leading producers to meet the views of buyers in the matter of prices has dampened the ardor of many would-be purchasers, the bulk of whom have followed the action of the Allis-Chalmers Co. and withdrawn from the market. The opposition is more pronouced to southern irons than to those of northern manufacture because of the less tightly sold condition of the former; and under the pressure exerted against these a considerable tonnage has been moved at $14 Birmingham for No. 2 foundry. One report has it that a lesser price has been quoted, but this is not generally credited. Nevertheless, the market is growing softer every week and $14 iron is now freely offered. Some tonnage has been sold at $14.50, but practically all of it was confined to small lots for quick shipment. The abundance of southern high silicon and low grade irons, and the shading that has been done in both have been powerful bearish factors in the downward tendency of the market. Sales of silvery running 4 per cent to 5 per cent silicon have been made at $18.15 Chicago, a reduction from the regular price of $1 a ton, and of gray forge at $12 to $12.25 Birmingham, prices considerably out of proportion with those asked for the most popular grades. There is no change apparent in northern irons other than that they are sharing in the dullness prevailing. Local prices for No 2 foundry range from $19 to $19.25 Chicago, and at these the market is strong. Lake Superior charcoal iron is firm at $20 Chicago and malleable Bessemer is also strong at $19.50 Chicago. The 25 cents advance in southern freight rates becomes effective March 1, making the carrying charges from Birmingham to Chicago, $3.90. Our quotations given below include this advance.

Lake Superior charcoal	$20.00
Northern Foundry No. 1	19.50
Northern Foundry No. 2	19.00
Northern Foundry No. 3	18.50
Northern Scotch Foundry	19.50
Ohio Strong Softeners No. 1	20.30
Ohio Strong Softeners No. 2	19.80
Southern Foundry No. 1	18.40
Southern Foundry No. 2	17.90
Southern Foundry No. 3	17.40
Southern Foundry No. 4	17.15
Southern No. 1 Soft	18.40
Southern No. 2 Soft	17.90
Southern Gray Forge	16.40
Southern Mottled	16.15
Southern Silveries (4 percent to 6 percent Silicon)	18.40 to 18.90
Jackson Co. Silveries, 8 to 10 percent Silicon	23.30 to 24.30
Alabama and Georgia Car Wheel	22.05
Malleable Bessemer	19.50
Basic Iron	18.65

Coke.—The low prices at present prevailing and the uncertainty that exists as to the outcome of the pending coal strike, have stimulated the demand for coke. Consumers are not only covering for their forward needs, but are laying in ample stocks for immediate use. Standard 72-hour Connellsville brands are offered at prices ranging from $2.75 to $3.00 ovens, or $5.40 to $5.65 Chicago, and furnace coke at $2.25 to $2.50 ovens. By-product coke, for spot shipment or future delivery, is quoted at $5.80, Chicago, or $3.15 ovens.

Billets and Wire Rods.—Current business continues of steady proportions and prices remain firm. Aside from occasional odd lots of forging billets offered by eastern and southern makers, it is next to impossible to obtain this product in this market. The Inland Steel Co. has none for sale either for March, April or May shipment, and the withdrawal of this interest ends the trading in the local product for the present. Forging billets brought in from the outside have been offered in round lots at $32 Chicago to effect quick sales, and at this price several thousand tons have been moved in the last few weeks. By the end of April, the Illinois Steel Co. will have all its new open-hearth furnaces in operation, and at that time it expects to have some tonnage to offer in the open market.

Iron and Steel Bars.—The feeling in bar iron continues one of weakness. For ordinary business, the market rests at 1.75c Chicago, but a good buyer can shade this from 50 cents to $1 a ton on desirable tonnage. Inquiry for iron is better and several large railroad and car contracts are pending. Specifications for steel continue to full contract quotas. A fair volume of new business is also current, some censumers asking prices on their year's requirements commencing with July next.

We quote carload lots, Chicago, delivery, as follows: Soft steel bars and bands, 1.66½c half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 2.06½c base, full extras; old rail stock, 1.70c to 1.80c. There is a good movement from local warehouses and jobbers' prices are firm. We quote bar iron, 2.25c full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛-inch and thicker, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half ovals and half rounds, $2 per 100 pounds base; steel bands, $1.95 to $2.00 half extras; soft steel hoops, $2.30 to $2.40 full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Sheets.—After the long period of light demand and sharp competition that prevailed in sheets up to within a couple of months ago, it is surprising to note the consistency of the present market. There is a never-ending stream of specifications on all manufacturers and mills are becoming badly congested. New tonnage is of no small proportions, much of it being taken without any promise of delivery. The congestion is the worst on galvanized sheets, for which the demand is heavy. Prices are very firm, mill shipments, Chicago delivery, being quoted as follows:

Nos. 8, 9 and 10, 1.86½c; Nos. 11 and 12, 1.91½c; Nos. 13 and 14, 1.96½c; Nos. 15 and 16, 2.06½c. Box annealed, Nos. 18-20, 2.26½c to 2.31½c; Nos. 22-24, 2.36½c; No. 26, 2.41½c; No. 27, 2.46½; No. 28, 2.56½c; No. 29, 2.71½c; No. 30, 2.81½c. Jobbers' prices are as follows: No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.70c to 2.75c; No. 30, 3.15c to 3.20c.

Quotations on galvanized shipments, carload lots, mill shipments, are as follows: Nos. 10-11, 2.51½c; Nos. 17-21, 2.86½c; Nos. 22-24, 3.01½c; Nos. 25-26, 3.21½c; No. 27, 3.41½c; No. 28, 3.61½c; No. 29, 3.86½c; No. 30, 4.11½c. From store, galvanized sheets are quoted as follows: Nos. 10 and 20, 3c to 3.10c; Nos. 22 and 24, 3.15c to 3.25c; No. 26, 3.35c to 3.45c; No. 27, 3.55c to 3.65c; No. 28, 3.75c to 3.85c; No. 30, 4.95c to 5c.

Merchant Steel.—Consumption of these materials is of good proportions and mills are heavily pressed with specifications. New business is light because of the refusal of producers to add to their present obligations except under great pressure. There is a slight movement in the form of inquiries involving requirements commencing with July next. Prices are very firm. Mill shipments are quoted as follows: Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c to 2.40c; smooth finished machinery steel, 1.91½c; smooth finished tire, 1.86½c

base; plow steel, 2.20c and upward, according to quality; toe calk steel, 2.21c; railway spring, 1.86½c. Cold rolled shafting, 50 per cent off in carload lots and 45 per cent in less than carload lots. Crucible tool steel, 6½c to 8c; special grades of tool steel, 13c and up.

Plates.—Transactions involving new tonnage are neither heavy nor numerous. Specifications against the tonnage under contract are also light and mills are actively seeking business for quick shipment. Prices are without change, mill shipment, Chicago delivery being quoted as follows:

Tank steel, ¼ inch and heavier, up to 100 in. wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates 3-16 inch thick, $7 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Store prices are very firm. We quote from local stocks: tank steel, ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—There is an excellent demand for structural shapes for quick shipment. Because of the ability of jobbers to fill these needs from their stocks, there is more activity among them than with mills. The latter, however, are booking a round tonnage every week for forward delivery, many local structural yards placing contracts for estimated requirements far into the future. Prices are very firm, especially those on store lots. We quote mill shipments, Chicago delivery, as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c; beams, larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work. Quotations on lots from store are as follows: All angles, 3 inches and larger, $2.25 per 100 pounds base; tees, 3 inches and larger, $2.30 per 100 pounds base; 3, 4, 7, 8, 9, 12 and 15-inch beams, $2.25 per 100 pounds base; 5, 6 and 10-inch beams, $2.50 per 100 pounds base; 18, 20, and 24-inch beams, $2.35 per 100 pounds base; 3, 4, 7, 8, 9, 10, 12 and 15-inch channels, $2.25 per 100 pounds base; 6 and 10-inch, 15-pound channels, $2.50 per 100 pounds base; 12-inch, 20½ pound channels, $2.35 per 100 pounds base; 5-inch channels, $2.75 per 100 pounds base.

Cast Iron Pipe.—Trading in water and gas pipe this week has been light. Several municipalities and gas companies that were figuring on round lots for early shipment have bought only a few hundred tons, postponing action on the larger needs until the market is softer. No change is noted in prices, and we continue to quote 4-inch water pipe, $31; 6, 8, 10 and 12-inch, $30; larger sizes, $29.50; gas pipe, $1 extra.

Merchant Pipe:—The volume of business from local consumers varies little from week to week. It is unusually heavy for this time of the year due to the mild weather that has prevailed, and mills have not been able to promptly fill all the specifications and orders received. On butt sizes of pipe the congestion is the worst, the leading interest being some weeks behind in its deliveries of this product. Prices are without change, and we quote carload lots, f. o. b. Chicago, as follows: ¾ to 6-inch black steel pipe, 78.35 per cent discount from list, and galvanized, 68.35 per cent. Minimum quotations from store are 76½ to 77 per cent discount on the base sizes, ¾ to 6-inch black steel pipe.

Boiler Tubes.—As evidenced by the returns in the form of specifications and new business, the consumption of tubes is heavy. Manufacturers of refrigerating and ice machinery have bought freely of late, these interests looking for a brisk season. The demand for locomotive tubes is also active, mills being crowded with specifications for early delivery. Prices are firm, official discounts being as follows:

	Steel	Iron	Seamless
1 to 1¼ inches	40.35	37.35	53.00
1¼ to 2¼ inches	54.35	39.35	40.00
2¼ inches	56.35	44.35	43.00
2¼ to 5 inches	62.35	51.35	
Up to 4¼ inches			50.50
6 to 13 inches	52.35	37.35	

Less than carload lots, from store, as follows:

	Steel	Iron	Seamless Steel
1 to 1¼ inches inclusive	40	35	42½
1¼ to 2¼ inches, inclusive	50	35	35
2¼ inches, inclusive	52½	35	30
2¼ to 5 inches, inclusive	60	47½	42½

Wire Products.—The pressure on mills for material becomes more insistent as spring advances. The mild weather that has prevailed this winter has very generally depleted dealers' stocks, and the scarcity of billets and rods has not enabled manufacturers to keep up with their customers' requirements to the extent desired. As a result, there is every expectation of a serious shortage this spring in all wire goods. Already mills are considerably behind in their shipments and the congestion becomes more pronounced each week. Until the summer slackness comes, if it is felt at all this year, little hope can be entertained of catching up with the delinquent tonnage, as nearly every day's mail brings in a larger tonnage than the daily output of mills. Prices are very strong, and much talk is indulged in by some independent interests of an early advance. We quote carload lots to jobbers, Chicago delivery, as follows:

Wire nails, $2; painted barbed wire, $2.15; galvanized barbed wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Old Material.—There is little demand for scrap from iron bar mills, these interests being very generally covered for some months ahead. From other consuming sources, however, mainly open-hearth plants, there is a better inquiry and trading with these users has increased in the last two weeks. Values are slightly stronger, though it is largely a sentimental improvement than otherwise. The Burlington R. R. disposed of its list last week, the prices obtained for No. 1 railroad wrought being in the neighborhood of $15.50. The Chicago & Northwestern railway, it is said, a few days previous, secured $15.90 for its railroad wrought. We have revised some of our prices, and quote gross tons in the first paragraph, as follows:

Old Steel Rails (4 feet and over)	$15.00 to 15.50
Old Steel Rails (less than 4 feet)	14.00
Old Car Wheels	19.00 to 19.50
Old Iron Rails	21.00 to 21.50
Relaying Rails, subject to inspection	27.00 to 27.50
Heavy Melting Steel	14.50 to 15.00
Mixed Country Steel	11.50 to 12.00
No. 1 R. R. Wrought	$15.00 to 15.50
No. 2 R. R. Wrought	14.50 to 15.00
Shafting	17.00 to 17.50
Dealers' Forge No. 1	12.00 to 12.50
Wrought Pipe and Flues	11.50 to 12.00
No. 1 Cast, 150 pounds and less	13.00 to 13.50
No. 1 Mill	8.50 to 9.00
No. 1 Busheling	10.00 to 10.50
No. 2 Busheling	10.00 to 10.50
Country Sheet	8.00 to 8.50
No. 1 Boilers Cut	11.50 to 12.00
Boiler Punchings	14.00 to 14.50
Iron Car Axles	22.50 to 23.00
Steel Car Axles	19.00 to 20.00
Iron Axle Turnings	11.50 to 12.00
Cast Borings	9.00 to 9.50
Mixed Borings, etc.	9.00 to 9.50
Machine Shop Turnings	11.00 to 11.50
Railroad Malleable	14.00 to 14.50
Agricultural Malleable	12.50 to 13.00
Stove Plate and Light Cast Scrap	10.50 to 11.00
Old Iron Splice Bars	17.50 to 18.00

CLEVELAND.

Some Improvement in Pig Iron.—Mills are Still Very Busy.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, February 28.

Iron Ore.—Shipping interests on the lakes are generally of the opinion that the labor troubles which have been threatened for some time will not materialize and that the season will open at an early date with conditions favorable for the establishment of a new record in the handling of ore. Preliminary arrangements for the opening

of navigation are already being made by the Pittsburg Steamship Co. and other fleet-owners and vessels at lower lake docks are already well coaled. The movement of ore from docks has improved somewhat and is now fairly rapid. Sales are only incidental at the following prices: Old Range Bessemer $4.25; Mesabi Bessemer $4.00; Old Range Non-Bessemer $3.70; Mesabi Non-Bessemer, $3.50.

Pig Iron.—The quiet tone which has prevailed for some weeks past is continued, though with inquiries and current business somewhat improved. Whatever tendency there is in the local market at present has been toward strengthening conditions and furnace men are well satisfied, as the demand for immediate and early shipments, coupled with specifications against unfilled orders, is taking their output and keeping their yards practically bare. The foundry melt is at an unprecedented rate, in many cases with an output double that of a year ago. Foundrymen are operating on a narrow margin of stock, as is evidenced by the insistence of their demand for iron whenever a furnace which is supplying them is unexpectedly blown out. Prices continue firm with Bessemer iron the strongest feature of the market. Though no large tonnages are included in the current business, the aggregate sales of the past week have been considerable. The buying movement for delivery later than July 1 has not developed as yet, though occasionally a contract is closed at prices now prevailing or higher. Local foundry iron is selling at $17.75 for No. 2 delivered, and Bessemer is very firm on the basis of $17.50 valley. The advance in freight from Alabama furnaces becomes effective March 1, and Southern No. 2 is still selling on the basis of $14 Birmingham. Coke continues to strengthen and furnace grades are selling at from $2.35 to $2.50 at the ovens with foundry grades about 60 cents higher. We quote Cleveland delivery as follows:

Bessemer	$18.10 to 18.35
No. 1 Foundry	18.00 to 18.50
No. 2 Foundry	17.50 to 18.00
No. 3 Foundry	17.00 to 17.50
No. 2 Southern	17.85 to 18.35
Gray Forge	16.35 to 16.85
Gray Forge, Southern	15.85 to 16.35
Lake Superior charcoal	19.50 to 20.00

Finished Materials.—Structural business continues strong and, if anything, the demand is more insistent both for deliveries on specifications and from stock. Wherever a mill is in a position to take on new business it finds orders exceedingly plentiful, with premiums procurable in some instances. The week has developed a considerable inquiry for tank plates with early deliveries obtainable. Sheets are in good demand with orders booked for some time ahead. Some small sales of light rails are reported and there are occasional inquiries for the heavier grades, though these are chiefly from interurban railway promoters for lines which never materialize further than the prospectus map. The bar iron situation continues much the same as last week with prices perhaps slightly lower on the average, though they have been brought into narrower limits, from 1.65c to 1.75c at Ohio plants. Mills with their output contracted for report specifications very heavy with frequent requests for advanced delivery.

Old Materials.—Prices have sagged still further during the week, with business practically at a standstill save for trading among dealers. The general level of quotations is below that of a year ago and the feeling prevails that the bottom is being approached though small declines are still to be expected. We quote, f. o. b. Cleveland, as follows:

Old iron rails	$21.50 to 22.50
Old steel rails (over 6 feet)	16.00 to 16.50
Old steel rails (under 6 feet)	16.50 to 17.50
Old car wheels	16.00 to 16.50
Steel boiler plate	12.00 to 13.00
Steel axles	20.00 to 21.00
Malleable iron (railroad)	15.00 to 16.00
Malleable iron (agricultural)	13.00 to 14.00
Heavy steel	14.00 to 15.00
Country mixed steel	13.50 to 14.00

We quote as follows, net tons:

No. 1 R. R. wrought	14.50 to 15.00
No. 1 busheling	12.75 to 13.50
No. 1 machine cast	12.50 to 13.00
Iron axles	22.00 to 23.00
Axle turnings	11.00 to 12.00
Wrought turnings (free from cast)	10.00 to 11.00
Grate bars	9.50 to 10.00
Pipes and flues	12.00 to 13.00
Tank iron	10.50 to 11.00
Hoop and band iron	7.50 to 8.00
Sheet iron	6.50 to 7.00
Wrought drillings	11.00 to 12.00
Stove plate	10.50 to 11.00
Cast borings	7.50 to 8.00

CINCINNATI.

Continued Absence of Buyers from Market Has Depressing Effect.

February 27, 1906.

Pig Iron.—The market during the past week has developed no new features. Inquiry is unimportant and sales continue light at unchanged prices. Lack of demand creates an easier feeling, but furnaces have made no change in their prices. Northern iron is still quotable at $17.25 for No. 2 foundry at furnace and southern iron $14.00 Birmingham. Some warrant iron and speculative holdings have been offered in this territory which has had a tendency to disturb buyers' views as to the steadiness of the market, as such offerings have been made at concessions. Reports as to the probable requirements of melters for second quarter needs are still conflicting, but, in the meantime, buyers seem to be complacent about their future needs and are showing but little interest in the market.

The week has offered so little in the way of development that the situation is practically unchanged although it is admitted that the continued lack of buying is in buyers' favor. With so little available in the way of information or indications as to second quarter needs and the position of furnace stocks, it is difficult to offer any forecast of the market. One feature only is clear and that is that there is an abundant supply of No. 4 foundry, gray forge and mottled in the hands of furnaces and that these grades have shown weakness while the higher grades appear to be firmly held at current prices.

It is noted also that sales agencies are not undertaking to handle warrant and speculative offerings at concessions for the reason that such procedure would be calculated to disturb the market for their regular brands. We quote f. o. b. Cincinnati as follows:

Southern Foundry No. 1	$17.25 to 17.50
Southern Foundry No. 2	16.75 to 17.00
Southern Foundry No. 3	16.25 to 16.50
Southern Foundry No. 4	15.25 to 15.50
Southern Foundry No. 1, soft	17.25 to 17.50
Southern Foundry No. 2, soft	16.75 to 17.00
Gray Forge	15.00 to 15.25
Northern Foundry No. 1	18.90 to 19.15
Northern Foundry No. 2	18.40 to 18.65
Northern Foundry No. 3	17.90 to 18.15
Jackson County Silvery, 8 per cent	21.15 to 21.65
Southern Charcoal	22.75 to 23.25

Finished Material.—The demand holds up well, and for quick deliveries of structural material premiums are being paid. Bar iron is practically the only item on the list on which prompt shipment can be obtained. The market holds firm at unchanged prices. Bar iron is quoted at 1.80c to 1.85c and the recent advance in sheets is well sustained. We quote: steel bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets, No. 10 and No. 12, in car lots are 2.58c. We quote black sheets, No. 27 at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.85c; No. 27, 2.75c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.15c. Tank plates are firm and sell out of store at 2 to 2.10c for ¼-inch and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

In merchant pipe the demand continues good and the market is steady. We quote f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts)

	Steel Pipe		Guaranteed Wrought Iron Pipe	
	Black Per cent	Galv. Per cent	Black Per cent	Galv. Per cent
⅛ and ¼ inches	69.7	53.7	....	....
⅜ inch	73.5	61.5	....	....
½ inch	73.7	61.7	....	....
¾ to 6 inches	77.7	67.7	....	....
7 to 12 inches	72.7	57.7	....	....

Coke.—There is a fair business in prompt shipment coke with no change

in prices. Quotations in the leading producing districts are as follows:

†Wise County, Va. Furnace Coke prompt shipment	$2.50 per ton
Wise County, Va. Foundry Coke prompt shipment	3.00 to 3.25 per ton
Pocahontas Furnace Coke on contracts	2.50 per ton
Pocahontas Foundry Coke on contracts	2.75 to 3.00 per ton
Connellsville Furnace Coke prompt shipment	2.50 per ton
Connellsville Foundry Coke prompt shipment	2.90 to 3.25 per ton
New River Foundry Coke on contracts or prompt shipment	3.00 to 3.25 per ton
New River Furnace Coke, prompt shipment	2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 per ton on $9.00 pig iron, plus 17 per cent of the advance on pig iron above $9.00 Birmingham

Old Material.—The market continues easy with prices irregular. We quote f. o. b. Cincinnati:

Old No. 1 railroad wrought, net tons	$15.50 to 16.00
Cast machine and foundry, net tons	13.00 to 13.50
Old iron rails, gross tons	22.00 to 23.00
Old steel rails, gross tons	15.50 to 16.00
Old short lengths, gross tons	16.00 to 17.00
Old iron axles, net tons	22.00 to 23.00
Stove plate, net tons	10.50 to 11.00
Wrought turnings, net tons	10.50 to 11.50
Cast borings, net tons	8.00 to 8.50
Car wheels, net tons	17.00 to 17.50

NEW YORK.

Pig Iron Sales Less than for Many Weeks.—Prices Fairly Well Maintained.

OFFICE OF *The Iron Trade Review*, ROOM 1315, No. 150 NASSAU ST., February 27.

Pig Iron.—The market has been quiet with small sales and no inquiry of consequence, but no significant features have developed. The movement of metal on old contracts is as brisk as ever and practically all the iron taken has been needed for immediate consumption. Consumers are mostly covered for some weeks to come and are not unwilling to consider the future during the present period of uncertainty. For similar reasons producers are not pushing sales. With few exceptions they are sold up well into the summer and as a rule are taxed to the full to meet the demands of their customers. The uncertainty and unsettled feeling is not due wholly to the miners' strike cloud. There is a sense of unrest in financial circles due to a number of other causes chief among which is doubt as to the outcome of the present attempt at railroad rate legislation. The producers are in doubt as to the future values of raw materials and prefer to wait for more settled times before committing themselves to contracts involving definite quantities. Prices remain practically unchanged, shading of quoted figures being, if anything, less frequent than last week. Individual sales of the week were almost too small to warrant mention. A lot of 500 tons of malleable Bessemer for delivery during the second half was the most considerable transaction for forward shipment. A lot of 300 tons of No. 2 northern foundry brought full prices, and another of 100 tons sold under unusual conditions yielded a slight premium over current quotations. There were also sales of 400 tons of No. 2 eastern Pennsylvania, 300 tons New York iron, 400 tons No. 2 soft Alabama and many orders for smaller quantities involving lots of 25 tons and upward. Ferro-manganese continues to show an easier tone, comparatively small lots for March and April delivery having sold at $120 and $130 and for shipment during the second half at prices ranging from $100 per ton according to quantities and conditions.

Northern No. 1 Foundry	$18.50 to 19.00
No. 2 Foundry	18.00 to 18.50
No. 2 Plain	17.75 to 18.00
No. 1 Southern Foundry	18.50 to 18.75
No. 2 Southern Foundry	17.75 to 18.50
No. 3 Southern Foundry	17.25 to 17.75
No. 4 Foundry	16.75 to 17.25

Pig Iron Certificates.—Certificates and warrants have been dull on the New York Produce Exchange and sales were few. On Saturday 100 tons of the regular classification for delivery in June sold at $16.35. Prices were almost stationary. Foundry iron warrants follow:

	Bid.	Asked.
Cash	16.25	
March	16.25	16.90
April	16.25	16.90
May	16.25	16.90
June	16.25	16.90

Finished Iron and Steel.—The amount of new business taken in the structural field has been fair and the aggregate of rail tonnage has been satisfactory being more nearly normal than the huge tonnages booked in January. The bulk of the week's business has been in small orders, which together make up a considerable total. The American Bridge Co. during February accepted contracts calling for 60,000 tons of steel in all. The largest single lot for the week is 2,700 tons which will be furnished for work on the N. Y. Central R. R. to complete a job undertaken by another firm. Other business includes 800 tons of steel for highway bridge work in Massachusetts, 500 tons for the Atchison, Topeka and Santa Fe road, and 600 tons for an office building in Philadelphia. There are several other contracts in sight. Contract for the Royal Insurance Co.'s building has been let to the Post & McCord Co., but the order for the 2,000 tons of steel is yet to be placed. Several power houses to be built for the New York Edison Co. will require quantities of steel, the largest about 1,500 tons. A bank building to be erected at Nashville, Tennessee, will require 2,000 tons and an office building for Hartford, Conn. 1,000 tons more. The order for the material to be used in the new Astor apartment hotel will be placed this week. The market for the lighter forms has been somewhat quiet, with comparatively small sales. Following are the prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84¼c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.84½c to 1.89½c; soft steel bars, 1.64½c to 1.84½c; sheets, No. 28 black, 2.40c.

Old Materials.—There has been no improvement during the week. Prices are weak and irregular all along the line making market values extremely uncertain. Most lines exhibit considerable pressure to sell and only a few holders have confidence in the future, believing that less than a month will witness a decided change in tendency. Dealers are offering heavy melting steel stock freely and in some cases selling short. Sales of 6,000 tons in shape for charging were reported during the week. A lot of old heavy section steel rails of 350 tons was sold for delivery at the buyer's mill. Low phosphorus steel scrap seems to be in better demand, and sales of this classification aggregating 1,400 tons are recorded. The following are prices approximately f. o. b. tidewater:

Old iron rails	$21.00 to 22.00
Old steel rails, long lengths	14.50 to 15.00
Old steel rails, short pieces	14.00 to 14.50
Relaying rails	22.00 to 23.00
Old car wheels	17.50 to 18.00
Old iron car axles	24.00 to 25.00
Old steel car axles	18.00 to 19.00
Heavy melting steel scrap	14.25 to 14.50
No. 1 railroad wrought scrap	18.00 to 19.00
Iron track scrap	16.50 to 17.00
Wrought pipe	13.50 to 14.00
Cast borings	10.00 to 10.25
Wrought turnings	14.00 to 14.50

PHILADELPHIA.

Buyers are Hesitating and the Market is Not So Strong.

February 27, 1906.

Pig Iron.—The past week has been an unusually quiet one, so far as new business is concerned. Consumption, as measured by the urgent demands for prompt shipments, must be keeping well up with production, but interest is gradually centering more upon the last half of the year than upon the demands of the present or the immediate future. Consumers hardly expect any concessions for March and April delivery but beyond that there are so many elements of uncertainty that prices show the effects of these doubts. The situation is not essentially weaker, but buyers naturally wish to be more assured as to future requirements before commiting themselves to present prices. Foundry irons have generally remained firm under this condition of

affairs, but standard gray forge has declined a little, and basic is hardly so strong as it was. Low phosphorus continues so scarce that it readily brings $26 a ton. The reductions in price, it should be understood, do not apply to orders for prompt shipment, but rather to the comparatively small business being placed for the latter part of the second quarter and the last half of the year. Prices may be quoted as follows:

No 1X Foundry	$19.00 to 19.50
No. 2X Foundry	18.50 to 18.75
No. 2 Plain	17.75 to 18.00
Standard Gray Forge	16.25 to 17.75
Basic	17.75 to 18.10
Low Phosphorus	25.50 to 26.00
Southern No. 2X, rail	18.75 to 19.00

Finished Material.—The situation here too seems to be gradually growing easier, owing to the increased capacity of the mills catching up with the orders that have so long crowded the books. New business is not reported in such volume as during the last few weeks, but as the mills already have enough to keep them busy for months there seems to be no immediate cause for anxiety. Prices remain unchanged as follows: Beams, channels and angles according to specifications, 1.82½c to 2.25c; refined iron bars, 1.75c to 1.85c; steel bars, 1.63½c to 1.83c; plates, 1.83½c to 1.88½c.

Old Material.—Prices continue to droop under the adverse influence of lack of demand, embargoes and the accumulation of supplies. The hope is expressed that there will soon be a turn for the better, but in the meantime the market continues very weak and prices may be quoted as follows:

Old steel rails	$16.15 to 16.25
No. 1 steel scrap	16.00 to 16.50
Old steel axles	20.00 to 20.50
Old iron axles	25.00 to 25.50
Old iron rails	22.00 to 22.50
Old car wheels	18.50 to 19.00
Choice scrap, R. R. No. 1 wrought	19.50 to 20.00
No. 1 yard scrap	17.50 to 18.00
Machinery scrap	15.75 to 16.25
Low phosphorus scrap	22.00 to 22.50
Wrought iron pipe	14.75 to 15.25
No. 1 forge fire scrap	15.00 to 15.50
No. 2 forge fire scrap, ordinary	12.00 to 12.50
Wrought turnings	14.00 to 14.50
Axle turnings, heavy	14.75 to 15.25
Cast borings	10.50 to 10.75
Stove plates	12.25 to 12.75

BIRMINGHAM.

Shipments Rushed on Account of Higher Freight Rates.

Birmingham, Ala., Feb. 26.—The shipments of iron are still very active. Sunday the railroads handled a tremendous amount of iron from this district, all engines used during the week on the mineral branches being brought to the main line to move out the accumulated traffic. The efforts made to ship out as much iron as possible before March 1, when the advance in freight rates goes into effect were not in vain and the reports of the car service association and southern iron committee for the first two months of the year will be phenomenal.

It is denied in this section that there is any iron on the yards that can be resorted to should there be an extraordinary demand for the product. A wrong impression has been sent out from the north in this regard, says a prominent iron man. There is very little iron on the yards in the southern territory as compared with what was to be found here a year ago. Much of the iron that is to be seen here has been sold, it is further related, and only awaits instructions as to delivery.

The production with good weather is very steady. The furnaces are doing nicely, while there is no interference whatsoever at any of the mines or coke ovens. The output at the ore and coal mines is on the increase. The coke supplies are improving slowly.

The Tennessee Coal, Iron & Railroad Co. has blown in the Alice furnace in the city. The iron-maker will cast upwards of 200 tons of iron a day. The work on rebuilding No. 5 furnace at Ensley is being pushed. The Sloss-Sheffield Steel & Iron Co. will shortly be ready to blow in the city furnace which has been under repairs for several weeks now.

The steel plant at Ensley (Tennessee Coal, Iron & Railroad Co.), is making a large output. A new engine is being placed in the steel rail department and it is expected that when the improvement is in the production will be at least twenty per cent better. There is still a strong demand for steel rail and other products of the plant.

Pipe shops in this districts are very busy with orders in hand or in sight which will keep them busy for many months. The plant of the Central Foundry Co., (pipe works), at Bessemer was closed down last week on account of a strike on the part of the employes. The men objected to a newly appointed superintendent. The differences have been amicably settled and work has resumed. The general headquarters of this concern are in St. Louis, Mo.

Brass foundries in the Birmingham district have much business in hand, furnace tuyeres, jackets and other parts being needed in number.

The Metal Market.

NEW YORK.

February 27

Pig Tin.—There has been a decided lack of vitality in the market during the week with stocks increasing. Today's quotations follow: Spot and February, 36.15 to 36.35; March, 36 to 36.30; April, 35¾ to 36.15; London, £165 10s and £163 5s; arrivals for the month to date, 3,060; afloat, 3,810.

Copper.—Copper is firmer owing, it is said, to artificial stimulation which may however be exerted for months to come. Today's closings follow: Lake, 18 to 18¼; electrolytic, 17⅞ to 18⅛; casting, 17¾ to 17⅞; London's closing today: £79 and £76 10s. Exports for the month to date, 12,603 tons.

Lead.—The market has been quiet with light inquiry. Today's closings, 5.35 to 5.45; St. Louis, 5.27½; London, £15 15s.

Spelter.—The local market for refined spelter has been dull. Today's closings, 6 to 6.10; St. Louis, 5.90; London, £25.

Antimony.—The market is unchanged. Today's prices: Cookson's, 16c to 17c; Hallett's 15c to 16c; other brands, 14¾c to 15½c.

CHICAGO.

February 27

There is a better feeling in all metals and the tone of the market is much stronger. Demand has improved and shading of prices has almost wholly vanished from local conditions. We quote lake copper, 18½c to 18¾c in carload lots; casting copper, 18¼c to 18½c; pig tin, car lots, 37½c to 38¼c; less than carload lots, 38½c to 39½c; spelter, 6⅜ to 6¾c for car lots; pig lead, desilverized, 5½c to 5¾c for 50-ton lots, corroding, 6c to 6¼c for 50-ton lots; sheet zinc, $7.75 list f. o. b. LaSalle, on car lots of 600-pound casks.

Old metals are without material change, demand being light and prices weak. Approximate prices of local dealers are as follows: Copper wire, 15¾c; heavy copper, 15½c; copper bottoms 14½c; copper clips, 15½c; red brass, 14¼c; red brass borings, 12¾c; yellow brass, heavy, 10¾c; yellow brass borings, 9¾c; light brass, 8¼c; lead pipe, 4¾c; tea lead, 4½c; zinc, 4¾c.

BROWN-CORLISS PLANT TAKEN OVER.

The Brown-Corliss Engine Co., of Corliss, Wis., a short distance south of Milwaukee, has been taken over by a committee of Pittsburgers consisting of W. H. Nimick, president of the Keystone National Bank, Otis H. Childs, of the United Engineering & Foundry Co., and J. B. Shea and will be reorganized and operated under the name of the Wisconsin Engine Co. The Brown-Corliss Engine Co., has been in bankruptcy court and the Pittsburg committee represented the bonds of the company, the consideration paid being $90,000 and the bonds. The plant is now practically ready for operation. The officers are W. H. Nimick, president and W. P. Marr, secretary-treasurer.

THE CONCENTRATION OF MANUFACTURE.

In an editorial on the above subject, *Engineering*, in a recent issue says:

"Concentration may be of two kinds, of quite diverse natures. It may mean the focusing of all the skill and industry of an establishment in the production of a single object or type of objects, and it may also cover the association or aggregation, under one management, of all contributary or cognate industries necessary to the production of a complicated or comprehensive work. Both these systems are worthy of consideration, because of the direct and considerable influence which each, under special conditions, may have on economy of production.

"The concentration of management in a factory producing one item only, has its advantages. It finds its fullest application and perhaps its highest success in the production of such accessories as valves or units, which may be more fully described as appendages rather than components. Where there is an extensive demand, it is well worth the while of the manufacturer of such specialties to devote much time and expense to the design of every little detail, since the cost of such effort is distributed over the great output, and becomes a negligible quantity. With each repetition he obviates the multiplication of useless patterns and molds. But, on the other hand, a mistake may be repeated many times before it is discovered.

"The balance of advantage, however, will be in favor of the system of concentrated manufacture, for the effects of mistakes are transient, while the results of standardization and repetition are lasting, and grow more certain with lapse of time. The manufacturer of one type of article has not his attention occupied long with design. His output attains its mature form early and then changes but very slowly, so that he is left free to turn his whole attention to improve his manufacturing processes, and cheapen their cost. He can then develop machine tools of special kinds, and improve every detail of his system, with a view of reducing the expense in his output.

"But there is one ever present danger, that plant evolving a special article of manufacture may become useless by the early supersession of such an item. Specialization in manufacture can only succeed if the article made is of the standard type, and is likely to be in continuous demand for a sufficient period of time to give a fair return to the plant before it requires to be scrapped.

"Where a system of confining the manufactory to one type of object is extensively accepted, the capital involved in one establishment is moderate. On the other hand, times of trade depression bring a complete collapse rather than a partial cessation of work as would be the case if there were many products.

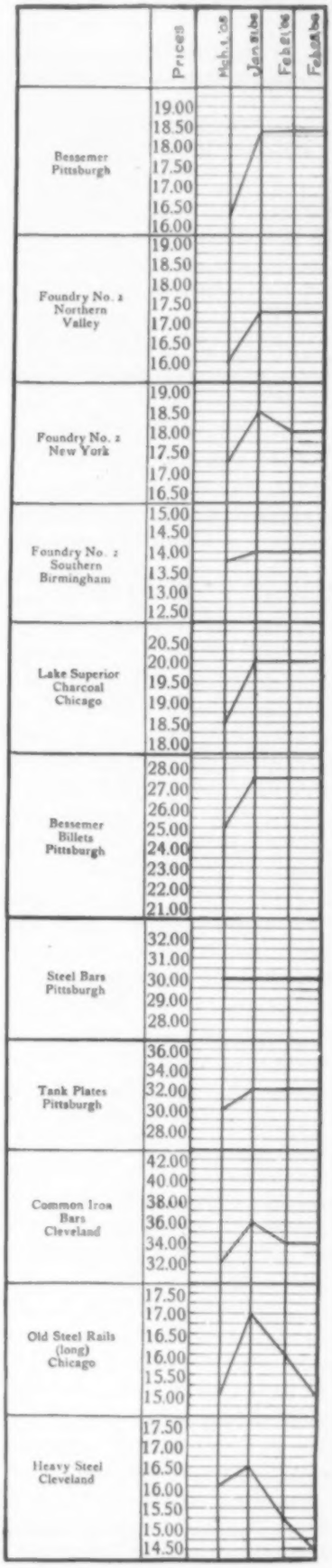
"Specialization too may involve serious limitations in reference to improvement in mechanical science. There is a danger of the mind becoming so concentrated on a detail as to exclude consideration of the other items with which it ought to harmonize. The machineman who continues for years to carry out, say, one of the eighty operations required in the manufacture of the balance wheel of a watch, cannot learn much. The present advantage of a good piece or premium rate of wage blinds him to the importance of prospective advancement, which may be more or less remote.

"There is gain from the point of view of progress and, perhaps, also of economy in aggregating in one manufactory all the processes necessary to the completion of a machine or some other object. There are limits, however, beyond which it is not well to carry these processes. An engineering establishment which aims at being a universal provider can never hope to attain pre-eminence, or to be certain of mechanical success. We have known cases, where departments have had to be isolated because in one a much higher degree of accuracy had to be attained than in the other. The concentration of cognate industries necessary for the completion of a given product must lead to economy, if wisely directed, and if each branch is self contained and well nurtured, by careful and originative staffs."

The annual report of the Union Switch & Signal Co. for the year ending Dec. 31, 1905, shows gross earnings of $2,979,151, heavier by more than a half million than in any previous year, and net profits of $409,667, the equivalent of more than 20 per cent earned on both classes of stock. The surplus is now well over $1,000,000.

C. M. Schwab sees no evidences whatever of depression in the steel trade. In a recent interview he said: "The consumptive powers of the United States for steel are unlimited. Many new high records will be made and broken during the next ten years. It is safe to say that the boom already here is only beginning and nothing, in my opinion, can occur to give the industry a setback."

PRICE CHART.



THE IRON TRADE REVIEW

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BRITISH TRADE WITH SOUTH AMERICA.

British iron and steel exports to South America appear to be rapidly increasing. In January, 1906, there were reported exports amounting to 32,376 gross tons to the Argentine Republic alone, the list embracing rails, miscellaneous railroad material, wrought iron bars and galvanized and corrugated sheets. The rail exports increased from 4,681 tons in January 1905, to 14,888 tons last January, while galvanized and corrugated sheets increased from 6,909 tons to 14,129 tons.

This little republic, while having about one-third the area of either Brazil, the United States or Canada, has a population of only 4,794,000 according to the last estimate, but is a good consumer of iron and steel. In the calendar year 1905 British rail exports to it amounted to 103,913 tons, against 83,063 tons in the previous year. From climatic conditions, it is a large consumer of galvanized and corrugated sheets, the British exports thither being 57,798 tons in 1904 and 67,370 tons in 1905.

Outside of the Argentine Republic, British exports to the American continent are relatively light. To Chili rail exports increased from 352 tons in January, 1905, to 759 tons in January last, while the total for 1904 was 13,537 tons and for 1905 16,141 tons.

The total British rails exports to South America, except probably for some small tonnages which were not separately enumerated, amounted to in 1905 to 120,054 gross tons, made up, as noted, of 16,141 tons to Chili and 103,913 tons to the Argentine Republic. The United States barely outclassed England last year, having exported 124,632 tons of rails to all of South America, being in the lead, therefore, by but 4,578 tons. The United States will have to do better this year to maintain the lead, if the British figures for January are any criterion, since they indicate a rate of rail exports to Chili and the Argentine Republic of 188,000 tons per year.

MONONGAHELA RIVER TRAFFIC.

No small factor in Pittsburg's success has been the cheapness of traffic on the Monongahela river, coal being brought down from mines along the river at almost no expense, and delivered to iron and steel plants lining both banks of the lower river. The total tonnage of the Monongahela river in 1905 passed the 10,000,000 net ton mark, for the first time. The tonnage compares not unfavorably, all things considered, with that of the canals at the Soo, which in 1905 bore 44,270,680 net tons of freight. The Monongahela river has 15 locks, numbered from Pittsburg, and making the river navigable to Fairmont, W. Va., 127 miles from Pittsburg. The total tonnage of the river in 1905 was made up of 9,852,211 net tons downstream and 1,140,922 net tons upstream, a total of 10,993,133 net tons. The upstream tonnage represents simply that which passed up through Lock No. 1. The downstream tonnage is made up of what passed down through Lock No. 3, plus tonnage which originated in the two pools below.

Practically all the Monongahela valley iron and steel plants except those at Monessen and Donora are located below Lock No. 3. During December there passed down through this lock 767,680 net tons of coal. There were mined in the first and second pools 38,771 net tons, making a total of 806,451 net tons. There passed down through Lock No. 1 a total of 490,480 net tons, leaving a total consumption in the first and second pools of 315,971 net tons, making a rate of almost 3,800,000 net tons per year. A large proportion of this was used in the coking operations of a prominent Pittsburg producer, the balance being steam coal for iron and steel and other plants. The slackwatering of the Ohio from Pittsburg to below the mouth of the Beaver river is designed to be completed this summer. The bridge at the mouth of the Allegheny which stands as a bar to the navigation of that river, long objected to, will probably be removed in the near future. A large increase in the consumption of coal from the Monongahela river will follow in the Pittsburg district from these improvements, while at the same time shipments to lower river points will be encouraged.

Since the formation of the great iron and steel consolidations the trend has been very distinctly towards the establishment of centers of distribution. This has been particularly true of wire products. Ultimately the Ohio and Mississippi rivers will have located on their banks large distributing warehouses for wire products, sheets, merchant mill products and other finished steel lines, to which cheap water shipments will be made from the mills in the Pittsburg district.

EXPORT DUTY ON SWEDISH IRON ORE.

The prospects are that within the near future the Swedish government will place an export duty on iron ore. The matter came up last May, and was defeated in the Swedish Parliament by a very narrow margin. It is up again, and with more insistence, but immediate action is delayed by the fact that the upper house is wrestling with the problem of a duty graduated according to the amount of metallic iron contained in the ore, with rebates for particularly undesirable impurities, titanium, sulphur and phosphorus, while the lower house is concerned with the matter of establishing an increasing duty each year until a maximum is reached. The proposed maximum is three kronor—a trifle over 80 cents per gross ton. Meanwhile it is proposed to levy a nominal duty amounting to about five cents per ton, and strenuous opposition has already appeared in Germany and Great Britain. The Germans propose reprisals, having

a flexible tariff arrangement, while the British feel that the Swedish government should be grateful to England for the prospect that the British export duty on coal will be abolished.

Swedish exports of iron ore amounted to 3,677,841 metric tons in 1903 and 4,084,647 metric tons in 1904, according to official figures. More than three-fourths of the tonnage went to Germany, but England is using increasing quantities of Swedish ore.

The Swedish production of pig iron is relatively insignificant. It is claimed in some quarters that the Swedish magnetic ores cannot be well used except with non-magnetic ores, but the Swedish government either thinks differently, or concludes that it is better to make something out of the exportation of the ores, if they cannot be used at home.

Unofficial estimates of Swedish pig iron production in 1905 place the total at 527,300 metric tons, or 518,967 gross tons, and the total is compared with a similar estimate for 1904, by which a gain of 7,000 tons is shown. As a matter of fact, however, official figures for 1904 are available, and show a production less than the estimate, or 520,173 gross tons, so that there would really be indicated a decline of 1,206 gross tons.

The provisional returns of Swedish pig iron production in 1905 can be added to other statistics already collected, and make the world's pig iron production in 1905 as follows, in gross tons, the tonnage of "other countries" being taken as unchanged from 1904.

World's Pig Iron Production, 1905. Gross Tons:

United States	22,992,380
Germany	10,813,983
Great Britain	9,592,737
Belgium	1,329,109
Sweden	518,967
Canada	468,003
Other countries	7,825,662
Total	53,540,841
1904	44,883,295
1900	40,173,915
1890	26,980,810

For 1905 the figures for the United States and Canada are official; for England they are those of the British Iron Trade Association, which may be modified slightly later on by the Board of Trade returns, while the figures for Germany, Belgium and Sweden are provisional.

RAILROAD PROBLEMS.

The Traffic Club, of Pittsburg, is rendering important service in bringing about closer relations and more hearty co-operation between the railroads and shippers. The membership of the club is composed of railroad traffic officials and traffic managers of industrial concerns, including the large coal companies, all of the large steel companies and all the railroads having representatives in the Pittsburg district. This work is co-operative and its spirit is shown in a paper recently read before the members by Mr. L. C. Bihler, its president, of which liberal extracts are published in this issue. Mr. Bihler clearly shows that the problem of railroad rate regulation is not the only important question in which railroads and shippers are mutually interested. The disposition of the railroads to buy only in times of prosperity is well known, and although the plan suggested by Mr. Bihler of meeting the financial problem involved in the distribution of orders more evenly through times of depression as well as times of prosperity is not new, it is one that needs emphasizing whenever an opportunity presents itself. Nothing in the future can be more certain than that periods of panic and depression cannot last, and when this is known, every dictate of prudence would demand that times of prosperity be provided for. Great consolidations of industrial concerns have been able to do much to prevent panics, and if these efforts were followed by systematic buying by railroads in dull times there can be no doubt that both manufacturers and carriers would be benefited. In many cases new equipment ordered today could not be delivered for a year, but if orders for cars now badly needed had been placed when the manufacturing companies were not so busy, there would have been no trouble about delivery and manufacturing concerns would have suffered much less embarrassment. The annual report of a large steel car company, issued a few days ago, states that in 1894 it was absolutely necessary, for economy's sake, to dismiss the majority of its trained workmen. When business revived in 1905, it was extremely difficult to secure skilled workmen, and notwithstanding the fact that from the beginning of the year every effort was made to accomplish this result as quickly as possible, it was not until a number of months had passed that the plant reached a normal basis, and in consequence the output suffered during this period. At present the employes of this company number 8,000, while at the first of last year it was able to employ only about 2,400. Had the company been able to employ about 5,000 men regularly, conditions would have been more satisfactory, both to it and the railroads. By helping to extend the benefits of prosperity and curtail the results of depression, the railroads will help themselves as well as their customers.

Mr. Bihler's discussion of the coming universal car is also worthy of careful consideration, and the paper throughout is well worth reading.

VALUE OF CO-OPERATION.

When the great consolidations of industrial concerns were being formed, the criticism was frequently made that in the management of these immense aggregations there could not possibly be the close personal supervision which characterizes a concern of moderate size in which the owners are in close touch with all important matters. That there was some ground for this statement cannot be denied, and this fact was fully appreciated by the men prominent in the consolidated companies, who, by adopting methods not familiar to small partnerships and companies, have done a great deal toward making up for the loss resulting from the impossibility of close personal supervision of details by the owners.

Could anything be more invigorating than the methods employed by the officers of our greatest corporation? The heads of the various plants meet monthly and in an informal manner compare notes. There are discussions on fuel economy, methods of handling material, the productive capacities of machinery and men, and the causes of successes and failures. None of the conclusions are binding until submitted for further consideration, but it is safe to say that no one leaves a meeting without having gained at least a suggestion worth putting to the test.

Another stimulating practice of the

U. S. Steel Corporation which is impossible under the old regime concerns the constant comparison of records and reports. Headquarters received reports monthly from the various plants prepared upon blank forms showing not only current production, costs, etc., but also the figures of previous high records. Every manager has the mark of highest efficiency constantly before him to equal or surpass if he can. He is the athlete who with his eye fixed upon the highest chalk mark ever reached is straining every muscle to go a fraction of an inch beyond. No wonder record-breaking in the great plants is so common as to excite no comment.

No doubt many of the methods so successful when applied on a large scale can be and are employed in smaller enterprises. The important difference is this: the manager of an individual establishment may pay attention to all of these things: he of an aggregation of many not only can but must and does make use of every known means to increase efficiency.

HEARTY APPROBATION.

The following resolution was unanimously passed by an unusually large meeting of the members in District No. 9 of the National Metal Trades Association, at the Hollenden Hotel, Cleveland, Feb. 19:

"Resolved: That the chairman of this meeting be authorized and directed to write to the *American Machinist* and THE IRON TRADE REVIEW, expressing the highest appreciation and approbation of the members of the Ninth District N. M. T. A. in regard to the brave and patriotic attitude said journals are demonstrating in the maintenance of the "Open Shop" in the face of the printers' strike now being waged against them."

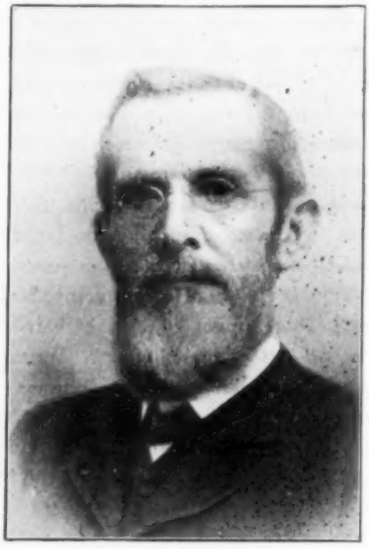
EMPIRE STEEL & IRON CO.

Jersey City, Feb. 28.—At a meeting of stockholders of the Empire Steel & Iron Co. today, the following directors were elected: Leonard Peckitt, C. H. Zehnder, Mark T. Cox, E. R. Chapman, Arthur A. Fowler, F. M. Jeffrey, J. W. Fuller, Janius S. Morgan, Archer H. Brown, the last to fill the place made vacant by the death of Anderson Fowler.

The Pratt & Whitney Co. has placed a contract for 1,500 tons of structural steel to be used in the erection of a new foundry and machine shop.

DEATH OF SAMUEL THOMAS.

Samuel Thomas, one of the founders and for many years president of the Thomas Iron Co., died at his home at Catasauqua, Pa., Feb. 21, at the age of 79. He was a son of David Thomas, who was the first to employ the anthracite blast furnace for the manufacture of pig iron. The Thomas family came from the south of Wales to this country in 1839, and at once the father and Samuel Thomas began work at Catasauqua, laying out the plant of the Crane Co. Samuel Thomas was then only a lad and completed his studies at Nazareth Hall, Northampton county, Pa., which he left at an early age to enter the



SAMUEL THOMAS.

blacksmith shop of the Crane Co. He manifested unusual ability as a manager both at the plant of the company and at its mines, and at the age of 21 superintended the erection of furnaces for the Boonton Iron Co., in Morris county, N. J., after which he returned to Catasauqua and supervised the erection of two additional furnaces for the Crane Co.

In 1854 the Thomas Iron Co. was organized and two furnaces were erected at Hokendauqua with Samuel Thomas as superintendent. Ten years later he was chosen president of the company, and continued in that capacity until 1887. When he resigned it was with no intention of retiring from active business, but with the idea of carrying out a desire to develop further certain Alabama properties rich in iron and coal which the Thomas interests had purchased directly after the civil war. Furnaces and coke ovens were erected, and coal and iron mines opened at Thomas, near Birmingham, under the name of the Pioneer Mining & Mfg. Co., which was managed by Edwin Thomas, a son of Samuel Thomas, until controlling interest was purchased by the Republic Iron & Steel Co.

Mr. Thomas was extremely fond of traveling and had gratified his fondness for paintings by collecting in the gallery at the Thomas homestead works of art representing an investment of several hundred thousand dollars. He was an enthusiastic churchman, much given to philanthropy and prominent at all times in promoting improvements at Catasauqua and Hokendauqua. His book "Reminiscences of the Early Anthracite Iron Industry," dedicated to the American Institute of Mining Engineers, at the California meeting in 1899, is well known.

NEW TOLEDO FURNACE.

The second furnace which the Toledo Furnace Co., Cleveland, is to add to its plant at Toledo during the coming summer, will be an exact duplicate of the one now in sucessful operation. Preliminary work is already under way and the construction will be rushed. As the ore, slag and iron handling devices built for the first furnace will be adequate for the needs of the new stack as well, it is expected that work can be completed in the fall and that iron can be made by Nov. 1. Julian Kennedy, who designed the original furnace which is noted for the efficiency of its devices for the handling of raw materials, is also engineer for the new stack, which will be 80 x 20 feet with a daily capacity of between 350 and 400 tons. Practically all the contracts have been closed. For the present the battery of coke ovens originally planned for construction in connection with the addition will not be built, but as yet no definite decision on this subject has been reached. H. G. Dalton is president and treasurer of the company and its product is sold through Pickands, Mather & Co., Cleveland, members of which firm comprise the Toledo Furnace Co.

LATE RAIL SALES.

(Special Telegram.)

New York, Feb. 28.—Late rail sales include the following: Texas Central, 5,500; Sea View, 3,800; North Jersey, 1,500; St. Louis & San Francisco, 11,500; trolley lines, 10,000 more. An additional heavy business from trolley roads is in sight, but there is considerable difficulty in offering prompt delivery.

The car works at Monoton, New Brunswick, together with 100 passenger and freight cars of the Inter-colonial Railway were destroyed by fire on the night of Feb. 24. The plant was owned by the government and the loss is between $1,000,000 and $1,500,000. More than a thousand men are thrown out of employment and there is no insurance.

THIRTY YEARS' LEASE OF HILL ORE LANDS

WILL BE CONTRACTED FOR BY THE UNITED STATES STEEL CORPORATION.

First Royalty to be Seventy Cents and to be Increased Every Two Years—Other Important Provisions.

(Special Telegram.)

Duluth, February 28.—A deal by which the immensely valuable ore properties of James J. Hill on the Mesabi are to pass into the control of the United States Steel Corporation for a period of 30 years is about to be consummated. Although no official announcement has been made, your correspondent is informed on authority reliable beyond a question that all of the terms have been agreed upon and the contract drawn. It is estimated that the Hill interests have ore deposits amounting to 300,000,000 tons, which delivered at Lake Erie ports would be worth $1,125,000,000. The terms of the contract provide that the Steel Corporation shall take a lease on these properties for 30 years, and shall pay for the first two years, 70 cents per ton for the ore mined and 80 cents for the carrying of the ore from the mines to Duluth on Mr. Hill's Great Northern railroad. It is further provided that after two years the price for ore in the ground shall be increased 5 cents every two years until at the end of 12 years the price shall be $1.00 and stay at that figure for the remaining 18 years of the period. Another important provision is that the Great Northern railroad shall be guaranteed freight amounting to 10,000,000 tons annually during the life of the lease. If mines other than those in the deal furnish the amount, the Steel Corporation will not be required to furnish any, but it must supply whatever is lacking of the stipulated tonnage.

The great advantage of this important transaction to the Corporation is evident. It insures the Corporation a tremendous tonnage and prevents the possibility of competing companies getting control of these great deposits. The policy of the officials of the Corporation will be highly commended and at the same time it is clear that the transaction will be very profitable to the Hill railroad. Last year this railroad carried 6,500,000 tons of ore and by the new arrangement it will largely increase this tonnage at a guaranteed rate which cannot be set aside by any legislation. The income which would result from the royalty would be fully $250,000,000 for all the ore, and the $8,000,000 per year which will be earned by carrying the ore will, of course, be additional. It can not, however, be stated with certainty that the corporation will mine all the Hill ore in 30 years.

Hill Properties Described.

The importance of the acquisition of the Hill properties by the steel corporation may be inferred from the details given below:

The J. J. Hill interests on the Mesabi range have been in process of accumulation for the past eight years, during which time a consistent policy has been pursued, until these properties have reached an extent second only to the holdings of the United States Steel Corporation, and are sometimes estimated as high as 400 to 500 million tons. These holdings are pretty well concentrated, and while many of them are leased to operating and independent steel making concerns, the located ore bodies still in Mr. Hill's hand are about 300,000,000 tons. Until about Jan. 1, 1903, Mr. Hill and his companies were actively negotiating for lands east of the western part of the Mesabi range going so far as to carry on negotiations for Vermillion range lands, but at that time a division of territory was agreed upon between Hill and the largest other interest in this district, and he withdrew and has since confined himself to that part of the Mesabi west of T 58 R 18.

The bulk of the Hill holdings were secured by the purchase, seven years ago, of the Wright & Davis land and the Duluth, Mississippi River & Northern railroad, a line built by Wright & Davis for carrying out a logging contract. This road reached from Hibbing to the Mississippi river and connected with the lake over the Duluth & Winnipeg road, which had an ore dock at Superior. The Wright & Davis lands, bought for their pine timber, were stretched across T 57 R 21, along the ore bearing formation, and included both the Mahoning and Stevenson mines. At the time of the sale to Hill the Mahoning was in operation and the Stevenson had been discovered, though but comparatively little other ore was absolutely known to exist on the lands. The price paid for these mines and the railroad, as well as the enormous and very profitable logging contract held by the road, was a trifle under $4,000,000. It now seems a mere bagatelle; but at that time money was very tight and the present conditions were unexpected.

More Lands Acquired.

Mr. Hill did not acquire additional lands for some time. He bought the Duluth & Winnipeg road, paying par for the $1,000,000 of stock issued, which stock represented actual cash that had gone into the construction of the road, and taking up the less than $1,000,000 of the underlying bonds that had been issued by the road to pay for lands supposed to contain ore but which were north of the ore-bearing formation. Some ore lands were gradually secured until the formation of the United States Steel Corporation, with its control of the two remaining roads reaching the Mesabi range. Mr. Hill at once saw that to make his road profitable he must have ore of his own sufficient to maintain his road at a high pitch of traffic, as the corporation's roads would haul its ore and as much more as it could get, and he expected the corporation to continue the acquirement of undeveloped ore lands. This, however, it did not do immediately. The field was for a time left to him and he improved the situation. With abundant funds obtainable at the lowest rates the Eastern Minnesota road, which was the title of the Hill line, began buying leases and fee tracts by the wholesale, but very quietly. The stocks of many companies owning lands upon the ore-bearing formation were secured at low prices, state leases were bought at advances over the royalties demanded, and many tracts were taken outright. In the meantime a very considerable exploring business was carried on and tracts were examined with the drill all along the range as far east as the Mountain Iron mine in the center of T 58 R 18. All the lands belonging to the Midway Co. and located on the ranges in towns 58 and 59 R 18, were bought outright, though they were not known to contain ore of value.

The Hill companies now control a strip of land six miles long on the strike and more or less continuous across the width of the ore-bearing formation in T 57 R 21. In this are the Mahoning, Stevenson, Leetonia, Burrows and several other ore bodies of importance and a large area of unexplored land of possible high value. By the advance of cash for the purchase of

other lands it also controls the traffic on several additional ore bodies in the same township.

Mr. Hill's Methods.

It has been a favorite method of Mr. Hill to assist intending buyers of ore mines to a part of the cash required in return for a contract for the traffic at going rate; and this has tied up to him a large amount of ore outside of his own ownership. Another method that has had the same result has been to permit the exploration of lands of his own under the royalty basis in return for the traffic that the intending explorers might hold in their own ownership. This has brought to him large contracts for freight.

Hill holdings west of T 57 R 21 include large free tracts, state and private leases of more or less value. The value of the range as one passes westerly is problematic, and much of the formation there is probably worthless for ore.

To the east of T 57 R 21 there is considerable tonnage north and east of Hibbing in T 58 R 20 under his control.

In T 58 R 19 the Wabigon and Wacouta iron companies, which hold large tracts, one of fee the other of state leases, are owned by this same interest. It has the traffic of the Grant, the Sharon, the Kinney, the Maitland, and other properties, and holds a large acreage of lands.

In T 58 R 18 all the Midway lands in the northwest part of the township are Hill-owned now, together with numerous other tracts, some of which are known to contain ore. He also has lands on the formation in the south part of the township north of this.

ONE QUESTION UNDECIDED.

(Special Telegram.)

New York, Feb. 28.—The directors of the United States Steel Corporation, at a meeting held yesterday, took no action concerning the proposed lease of the Hill ore lands. It is understood, however, that all of the principal conditions have been agreed upon, and that the undecided question, which is causing some delay in signing the contract, is whether the quality of the ore is to be guaranteed. It is stated that the Corporation asks for a reduction in the royalty if the analysis is not up to the guarantee; while on the other hand Mr. Hill asks that if the analysis is better than the guarantee, a higher royalty be paid. It is not believed that consideration of this question will be a serious obstacle toward the making of the lease.

VIEWS ON THE COAL STRIKE.

In response to a request from THE IRON TRADE REVIEW for an expression of their views concerning the threatened strike of coal miners, the following are among the answers received. Others will be published next week.

West Allis Malleable Iron & Chain Belt Co., West Allis, Wis.:—With reference to the threatened strike of the coal miners, will say, that while the situation is the subject of anxious consideration by the whole business world, we do not believe that there will be any wide-spread or very disastrous strike. We do not believe that the coal miners have any very serious cause for complaint and we believe that a slight concession on the part of the operators would result in even greater concessions on the part of the miners. At any rate it is hard to believe that either the operators or the leaders of the miners would bring upon the country such a serious calamity as would result from a general strike. We are buying and making contracts just the same.

The Elyria Iron and Steel Co., Elyria, Ohio:—We do not think there will be a strike. We believe that all consumers have prepared themselves with a sufficient stock of fuel to carry them for several months. In the event of a strike, there may be a small concession made to the miners, as we do not believe that the operators or manufacturing interests can afford to have a strike for any great length of time. In the event of a satisfactory adjustment of the dispute being arrived at prior to April 1, we think that it will undoubtedly stimulate business and all manufacturers can look forward to a very busy spring and summer.

Missouri Malleable Iron Co., East St. Louis, Ill.:—We are only in position to quote the opinion of the local operators, operating mines in the Illinois fields, and they all talk as though the chances for a compromise settlement, between now and April 1, were extremely remote; and are all advising their patrons to put in at least a sixty or ninety days' stock. Railroads and all large corporations in this section are stocking up, although even among those who are putting in stocks the opinion is frequently expressed that they do not think the strike will come off, but they think it policy to stock up, nevertheless, rather than take any chances. If a general strike is declared, it will be of such magnitude as to completely paralyze all industries, and it is our opinion that in consequence, it will be of short duration, as public opinion will force a settlement. We are, in consequence, only putting in a six weeks' stock, which, in fact, is all we can conveniently find storage room for.

The Vulcan Iron Works Co., Toledo, Ohio.:—Our opinion, we will admit, will not be based on very extensive research, but from our own stand point we have not believed that there would be any strike; that the interests on both sides are too extensive to consider this. We think that a great many people are fairly well provided with fuel, but of course there would be a great deal of unrest occasioned by a general strike. If a strike occurs we do not think for a minute it will be of long duration. The general business of the country, from our stand point, is very substantial indeed. We have never known such a demand for steam shovels and kindred work as there is at the present time, and the prospects are for a continuance of this for several years to come.

Stowell Mfg. & Foundry Co., South Milwaukee, Wis.:—We believe that the threatened coal strike will be avoided. We are optimistic enough to think that neither the operators nor miners would willingly precipitate such a disaster upon the American public and that calmer council and better judgment will in the end find some common ground that they can get together on and thus avoid a strike. Should there be one, however, the fact of its coming in the spring instead of the fall, will make it less harmful. We do not know anything about the merits of the issue between them and believe there should be some national legislation enacted that will provide a court for such disputes, so that the innocent public may not be made to suffer should such a strike take place. The president and congress cannot be better employed than by lending their good offices in endeavoring to bring such factions together and provide ways and means of preventing such disputes in the future. The provision made by the operators for supplying their trade with coal has been so ample that it does not seem as if there should be any serious interruption of business even should a strike take place and the manufacturers using coal have likewise prepared for such an emergency, so it seems to us there should not be any good reason why business should be injured unless the strike should be prolonged, but in our judgment we do not believe it will, even should it take place.

Moline Malleable Iron Company, St. Charles, Ill.:—We occupy such a small

corner in the malleable iron business and know absolutely so little about the real situation in the coal business that we would feel it very presumptuous to express an opinion on the probabilities of strike in that line. If we were to believe one-tenth of the agony expressed in the letters of our correspondents we would be apprehensive of being mobbed if we fail to take any precaution in the case and a strike did occur. We are doing the natural thing, therefore, under the circumstances and filling up our yard with coal and iron. Of course we will kick ourselves if the thing blows over and we have no strike, but on the whole think we would prefer that alternative.

Whiteley Malleable Castings Co., Muncie, Ind.:—We have about come to the conclusion that there will be no coal strike, and we arrived at this conclusion, that the strike will be averted from one or two causes, either the operators will reinstate the old scale, or that the coal miners have other business on their hands, such as securing harmony in their organization. We feel so sure that there will be no strike, or it will be of so short duration and quickly settled, that we are using our stock supply of coal. We have, however, enough to run us for four months, having made provisions. If a strike should occur on April 1, we think that it will be settled in three months, and our requirements would be taken care of for that period.

The Jeffrey Mfg. Co., Columbus, O.:—We do not believe that there will be a strike. We believe that the good judgment of both the miners and the operators and the seriousness of the situation will be brought home to them in such a way as to make them most generous in their dealings with each other. It does not seem to us that the miners are in any condition for a strike or that the operators themselves are in a condition for a strike and we feel that it would be a tremendous calamity to the whole country. We know that a large number of the large manufacturing concerns, which of necessity use a great deal of coal in the operation of their plants, are laying in a heavy supply so that they may be ready for the strike if it comes.

Shenango Furnace Co., Pittsburg, Pa.:—In our discussion with our trade on the subject of pig iron sales and prices, we do not find any definite feeling of apprehension that the strike is likely to occur. Both parties to the present controversy are amenable to public opinion, and the press of the country has thrown so much light on the points of contention that the impression seems to be that a fair settlement of the difficulties will be arrived at, or at least that should not this happy result be achieved by April 1, and a cessation of work be ordered by the miners, such stoppage would be merely an incident in the settlement, and no prolonged strike would be allowed to continue. The apparent inactivity of the pig iron market existing at present finds with some people a ready explanation in the statement that the threatening coal strike has created some depression. As a matter of fact we believe that the present condition represents a reaction after the heavy and continuous buying of pig iron which occurred during December and January, that most of the users have bought ahead over this period, and have the general impression that the mark of $17.50 and $17.75 is the high tide of the present market. The usually large buyers of pig iron have apparently provided for the bulk of their wants up until July 1, and the smaller concerns view the present outlook for free iron as almost sufficient to supply such trade as has not entered into these long time contracts. The situation is not weak, viewed from the standpoint of the furnacemen, but looks what may be termed easy to the foundryman and others who expect to draw their supply out of the present visible stocks; in other words, the excitement which prevailed during the heavy buying period has been allayed, and conditions are more normal. It cannot be expected by our trade that by the buying of pig iron will be continuous. A period of activity must be expected to be followed by one of quietude. The published reports of the sales of the large consumers in finished lines indicate nothing except that the demand for pig iron will be sustained during the year, and it is natural to expect that should this condition of prosperity be enjoyed, there will be more or less frequent repetitions of the present season of quietude.

New Cleveland Firm.—John M. Mulrooney, who established the *Marine Review*, and who has been connected with newspaper work in Cleveland for some sixteen or eighteen years past, has opened offices in the Rockefeller building for the purchase and sale of local securities. He is to have as a partner in business James J. Fitzgerald, who has been engaged in this line of work for three years past with Otis & Hough, and a seat has been purchased on the Cleveland Stock Exchange. Mr. Fitzgerald will give his entire time to the exchange work. The new firm will give special attention to vessel stocks and bonds, and with the wide circle of aquaintances possessed by both members should be successful.

The Ohio Iron & Metal Co., Chicago, has opened a branch office at 403 Citizens building, Cleveland, in charge of Armand Alexandre.

CLOSER RELATIONS

Of Two Large Associations Will be Considered at Cleveland.

The annual convention of the National Metal Trades Association at Cleveland, March 21 and 22 promises to be one of unusual importance. The principal subject under consideration will be the closer co-operation of the N. M. T. A. with the National Foundrymen's Association. The status of the merging of local associations into the National Metal Trades Association is as follows: The local associations at Chicago, St. Louis, and Cincinnati have become branches of the national body. The associations at Boston, Buffalo and New York city will become branches, effective March 1. The executive committees of the Cleveland and Syracuse associations have recommended the merging of their association to their memberships. The secretaries of the Worcester, Mass., Milwaukee, Philadelphia and Detroit associations are in correspondence with acting commissioner Wuest on the subject and there is probability of these associations merging in the near future.

The election of the district committees of the N. M. T. A. is now in progress and the names of the committees will be announced shortly.

Messrs. Paul Blatchford, secretary of the Chicago branch, J. M. Manley, secretary of the Cincinnati branch, J. W. Leigh, secretary of the St. Louis branch and Mr. H. C. Hunter, of the New York Metal Trades Association are making arrangements for special cars for the accommodation of the members of their associations who will attend the convention at Cleveland.

The Kansas City Bolt & Nut Co., Kansas City, Mo., expects to install a 16-inch 3-high train of rolls with the usual heating furnaces, complement of cropping shears, etc. It states that it may also be necessary to increase the present rolling mill building to accommodate the new equipment. Plans are under way for the erection of a two-story building 75 x 100 feet for machine and pattern shop purposes and to add a number of machines to the bolt and nut department. The entire expenditures will be between $75,000 and $100,000.

The Cherry Valley Iron Works, West Middlesex, Pa., is installing a fifteen-ton, forty-six-foot span, Northern crane made by Northern Engineering Works, Detroit.

The Ohio Cultivator Co., Bellevue, O., has been adding improvements to its foundry and installed a No. 66 Newton patent cupola of ten tons hourly capacity.

PERSONALS.

A. C. Dinkey, president of the Carnegie Steel Co., is still in Florida where he has spent about six weeks during the winter.

Edward Worcester, first vice president of the National Tube Co., has returned from a short business trip to the Pacific coast.

Walter G. Seeley Jr., of the Detroit Stove Co., is to become secretary of the Lincoln Stove & Range Co., at Fremont, O.

Louis Eshmer has been elected a director of the Warwick Iron & Steel Co., succeeding Edward Baily, who declined re-election.

Arthur A. Fowler and E. Isham, of Rogers, Brown & Co., New York office, returned from Europe on the Cunard liner Campania on Saturday, Feb. 24.

Albert Ladd Colby has opened an office at 477 Central Park West, New York, as consulting and inspecting engineer and iron and steel metallurgist.

Clinton S. Marshall, district manager of the American Steel & Wire Co., at Worcester, Mass., recently gave a dinner to about forty of his assistants at the Worcester works.

C. C. Wright of the Cleveland office of the Carnegie Steel Co. and Sterling Hubbard of Rogers, Brown & Co. sail the last of the week for a month's vacation in Jamaica.

W. P. Siebert, assistant general manager of sales for the Carnegie Steel Co., in charge of the rail and billet department, is now in California and will remain away until about April 1.

Robert Simpson has been appointed superintendent of the Bessemer rolling mills of the Tennessee Coal, Iron & Railroad Co. vice T. J. Kent, who has gone to Nova Scotia.

Frederic Nicholls has retired from the position of general manager of the Electrical Development Co., and the Toronto & Niagara Power Co., and is succeeded by Hubert H. Macrae.

Albert H. Heller, professor of bridge engineering at the Ohio State University, and consulting engineer for several bridge companies, is critically ill at the Shepard Sanitarium, at Columbus, O.

W. W. Bonsom, formerly manager of the Iowa Iron Works Co., has been given the active management of the plant of the Smedley Steam Pump Co., Dubuque, Iowa, having been advanced from the management of the mining machinery department.

James N. Wallace has been formally chosen general manager of the Pressed Steel Car Co., filling the place made vacant by the death of Geo. E. Mackin. The selection was made by the stockholders at their recent meeting in Jersey City.

Herbert F. Topp, for a number of years connected with the controller's office of the United States Steel Corporation, has taken service with the Dayton Coal & Iron Co., as sales agent.

E. R. Elliott, superintendent of the Negaunee properties of the Cleveland-Cliffs Iron Co., has resigned and will assume the general management of the Cuban mines of the Juragua Iron Co., a subsidiary of the Bethlehem Steel Corporation.

STEEL BARGES FOR RIVER TRAFFIC.

The American Bridge Co., has closed a contract with the American Steel & Wire Co., for the construction of ten steel barges for use in Pittsburg harbor and in hauling coal from the mines along the Monongahela river to the company's plants at Rankin and Shoenberger mills. This order is very gratifying inasmuch as it proves conclusively that the ten barges built for this company last year have been satisfactory.

The American Bridge Co. is now building at Ambridge the ten barges for the American Steel & Wire Co., two rectangular hulls, 30 by 130 feet, for five yard dipper dredges to be used on Panama canal work and a steamboat hull for James Rees & Sons, who have the contract to build a Mississippi river packet.

The Panama hulls will be built at Ambridge plant, together with the Ohio river boats and after being fitted will be taken apart and shipped, in "broken down" shape to the isthmus. Last year the Ambridge plant of the bridge company turned out seventeen hulls, ten of which were coal boats for the American Steel & Wire Co.

Will Have New Headquarters.—The Engineers' Society of western Pennsylvania has decided to take new headquarters in the Fulton building, Sixth street and Duquesne way, and give up the old headquarters at 410 Penn avenue, Pittsburg, and will move April 1. At a meeting of the structural section of the society, Tuesday evening, Feb. 27, the subject under discussion was "Erection Methods as Applied to Structural Steel Work," led by Willis Whited. A good attendance was present and the discussion was very thorough taking in all branches of the work from shop to field construction, together with technical details of each department.

The Railway Steel Spring Co. directors have declared the regular quarterly dividend of one and three-fourths per cent on the preferred stock, payable March 20.

OBITUARIES.

John H. Howe, Worcester, Mass., well known as a manufacturer of wire goods, died Feb. 15, at the age of 84. He retired from business some years ago.

Joseph Armbruster, until recently general car inspector of the E. T. V. & G. Railway, died Feb. 18 at his home in Knoxville, Tenn. He had been prominent in the foundry and carbuilding industry of the south for almost half a century.

Geo. W. Little, assistant treasurer of the Pittsburg Spring & Steel Co., died Feb. 16 of pneumonia. For a long time he was connected with French & Co. until in 1902 when he assumed the position which he held at the time of his death.

John M. Greist, president and chief owner of the Greist Manufacturing Co. of New Haven, Conn., died in that city on February 23, aged 60 years. He entered a local shop ten years ago as an ordinary mechanic and later secured control of certain patents for the improvement of sewing machines, the manufacture of which he developed into a considerable industry.

John Stanton, mining expert, authority on the copper industry, former president of the New York Metal Exchange and at one time superintendent of iron mines in New Jersey, died at his home in New York on February 22 at the age of 76. He was born in Bristol, England, and came to this country with his parents in 1835, his father being a mining engineer who was active in the region about Pottsville, Pa. Mr. Stanton was one of the founders of the New York Metal Exchange, was a director in a great number of copper producing companies and belonged to many clubs and societies in New York.

Edward Edwards, identified with the iron industries of the Lehigh valley for the past 40 years, died suddenly at his desk in the office of the Slatington rolling mill at Catasauqua, Pa., on Feb. 21. Mr. Edwards was born in Wales and came to this country in his youth and, after being active in various iron manufacturing enterprises, became president of the Slatington mills several years ago. He is the last of four men all born at nearly the same time and place in Wales, all prominent in the development of the iron industry of the Lehigh valley. The other three were William P. Hopkins, Oliver Williams and Samuel Thomas.

The Pittsburg Pipe & Equipment Co. is making plans for the erection of a new plant. The company will manufacture gas and steam fitting supplies.

A LARGE AND WELL DESIGNED CRANE SHOP.

The Plant of Pawling & Harnischfeger at Milwaukee, Wis.

BY AN EDITORIAL REPRESENTATIVE OF THE IRON TRADE REVIEW.

Pawling & Harnischfeger, Milwaukee, about one year ago moved into their newly erected shops at 38th street and National avenue. These shops were designed to facilitate in every possible manner the manufacture of cranes and hoisting machinery, which is the principal product of the firm. The general arrangement and the relation of the various buildings to one another are shown in one of the accompanying illustrations. The plant consists of five buildings, some of which are more or less sub-divided into various departments. It has excellent railroad facilities, being served by both the Chicago, Milwaukee & St. Paul railroad, and by the Chicago & Northwestern railway. The two roads form the the boundary to two sides of the property, side tracks from each run into the yard and to the various buildings, thus enabling raw material to be brought to the point where it is needed, and the finished product to be loaded on cars inside the buildings.

The office building, the pattern shop and pattern storage face on National avenue, the foundry, power house and machine shop being located directly behind them. The office building is of red brick, and comprises two stories and a basement. The main floor is used for the office of the company, while the upper floor contains the drafting room shown in Fig. 3.

The drafting room is a large, open, well lighted room, with sky lights in the center, and large windows along each wall. The drafting tables are arranged along the windows, thus giving plenty of light for the draftsmen to work by. A vault for the storage of drawings adjoins this room, the entrance to which is located directly under the clock in the illustration.

The system of filing drawings is somewhat unique. All of the drawings relating to any given job are, on its completion, gathered together in a roll, and placed in a metal tube. The tube is closed with a cap and on each a number is placed. This number is that of the job and is indexed together with any particulars concerning the job, which may be required. Thus, when it is desired to examine the drawings of any particular order, it is not necessary to search through a dozen different drawers of tracings.

The largest building in the plant is the machine shop. This is 353 by 300 feet in dimensions at the widest part, divided into several bays by columns, and one section is divided from the rest by brick walls. It is one story high, with the exception of several galleries along the side of the building, which are used for light work and storage purposes. Saw tooth roofs with a northern exposure give an excellent light on the interior. All the buildings, with the exception of the pattern storage and the office, have this type of roof.

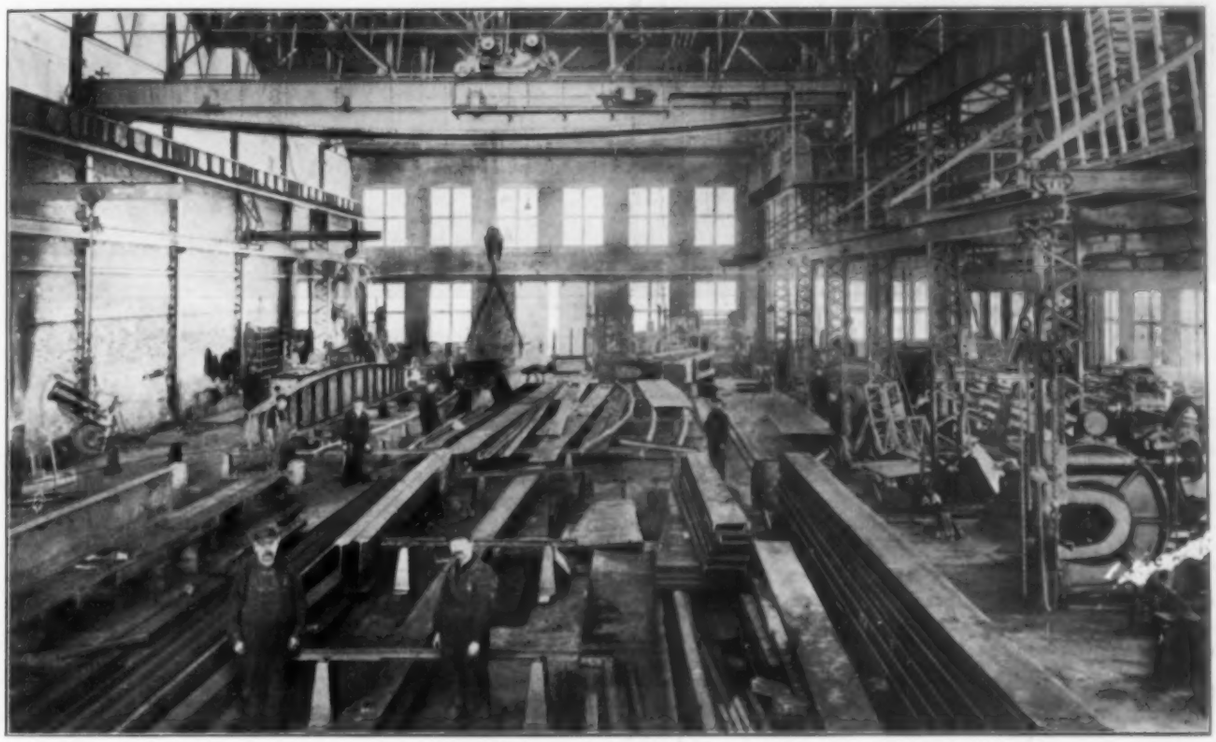


FIG. 1.—INTERIOR OF GIRDER SHOP, PAWLING & HARNISCHFEGER.

Girder Shop.

The first section in the machine shop is termed the girder shop. This is 90 feet wide and is divided from the rest of the building by a brick wall, which has a large doorway, extending nearly to the roof, at one end. It is spanned by two 15-ton electric cranes, built in the company's shops. In this department all the work of laying out the crane girders and of building them is accomplished. The equipment consists mainly of three shear presses situated between the columns on one side of the shop, an angle shear in the center at one end, together with a set of bending rolls. A number of drill presses are placed in convenient posi-

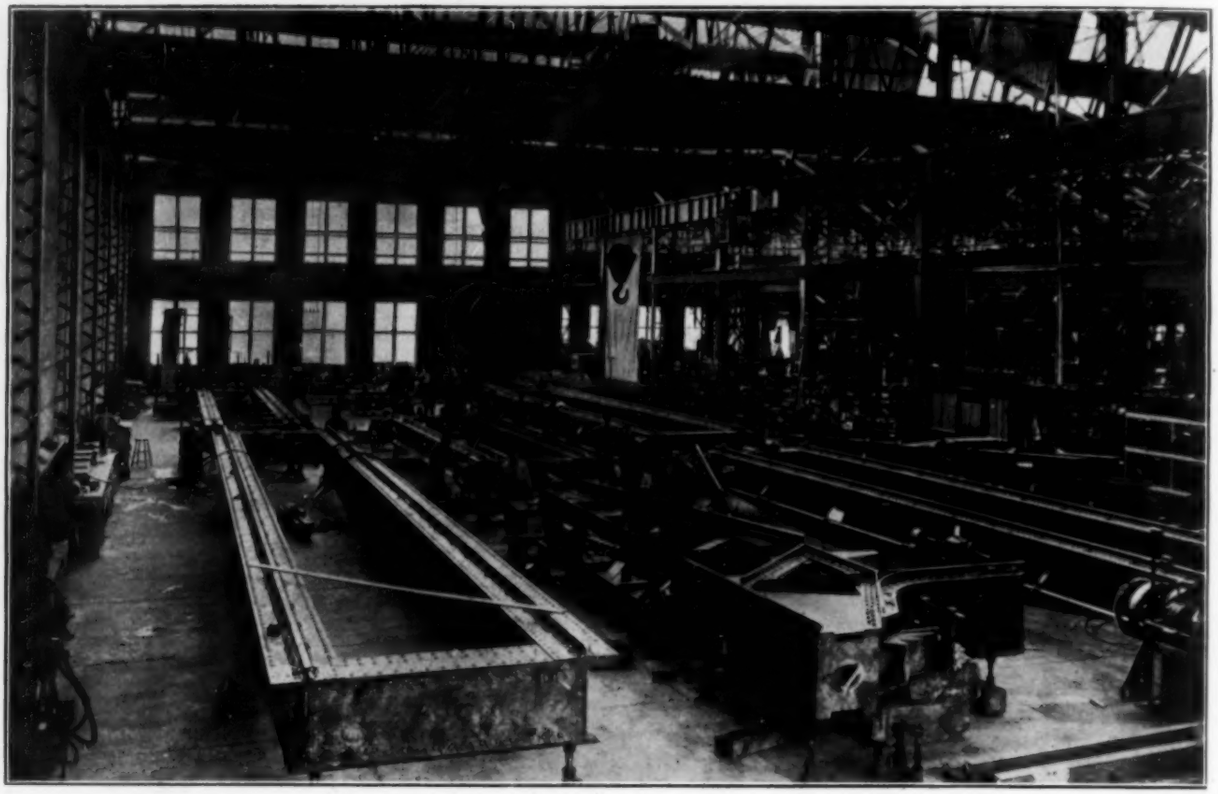


FIG. 2.—ERECTING SHOP, PAWLING & HARNISCHFEGER.

tions, and a large number of portable tools are in use. All the tools in this department, with the exception of the drill presses in one corner, are driven by individual motors.

Perhaps, two of the most interesting and apticeable features about this section of the shop are the hoisting arrangements alongside the shear presses, and the stands on which the work is assembled. The latter consist of cast iron standards, to which are fastened with clips, short sections of 18 pound rail. The crane girders are assembled on these, being at the right height for the workmen, and rendering every part of the work accessible. The stands are light and are easily transported to any section of the shop desired. A number of them are shown clearly in the illustration, Fig. 1.

This same illustration also shows very clearly the hoisting arrangement in front of the shear presses, which consists of a series of short I-beams set out horizontally from the columns, with trolleys arranged to run on their lower flanges. From these trolleys are suspended an I-beam, extending nearly the length of the shop, on the lower flanges of which run another set of trolleys carrying triplex chain hoists. The I-beam carrying the chain hoists can be moved in or out from the columns as desired, by means of a hand chain and sheave wheel on a small line shaft of the same length as the chain hoist I-beam. Keyed to the line shaft are sprocket wheels at each horizontal I-beam, which engage by chain belts with sprocket wheels on the trolleys. This arrangement permits of a parallel movement of the entire length of the hoist beam.

FIG. 3.—DRAFTING ROOM, PAWLING & HARNISCHFEGER.

As any two or three hoists can be brought close together to pick up a plate, it can be manipulated with extreme facility, and the matter of handling large work is very simple. The illustration shows the arrangement in use opposite the second shear press; a large plate, which would ordinarily require the services of half a dozen men, is being handled by one man and his helper.

On the opposite side of the shop will be seen the arrangement in use for handling the portable riveters. This consists of two hand operated, traveling wall

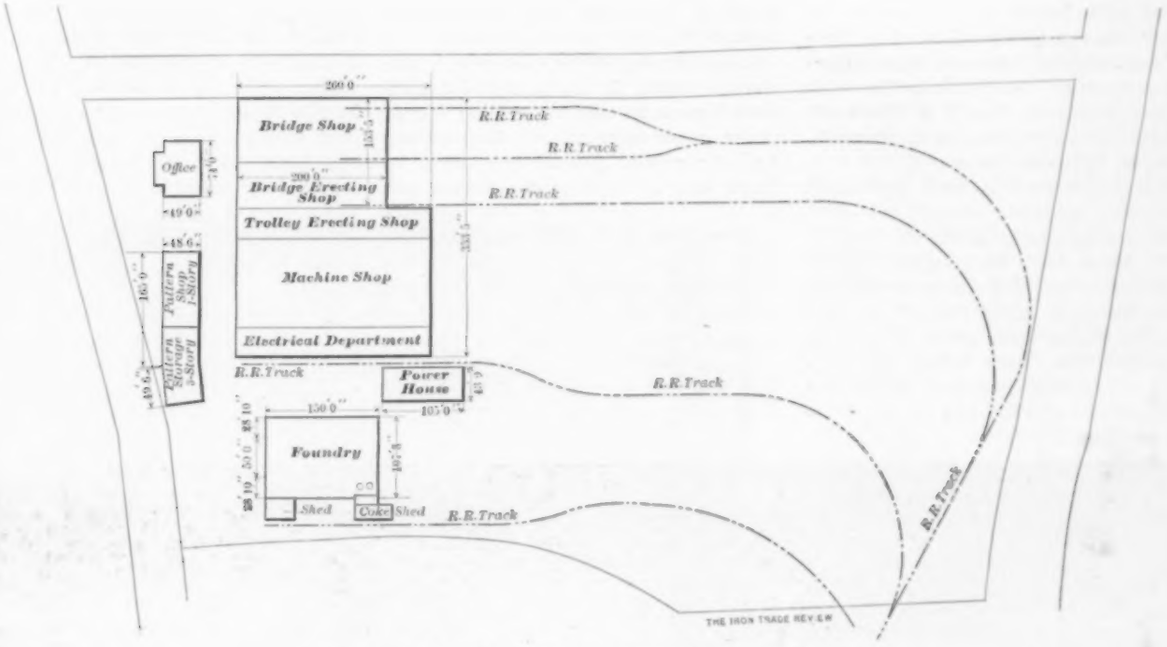


FIG. 4.—PLAN OF PAWLING & HARNISCHFEGER PLANT.

cranes having triplex chain hoists suspended from trolleys that travel on lower flanges of the booms. These cranes operate the length of building under the overhead traveling cranes, thus allowing the riveters to be moved to any position within 15 feet of the wall.

The outer bay of this shop is floored over, and the template shop is located in the gallery thus formed. It is equipped with carpenter benches and a few wood working tools.

Erecting Shops.

When the girder has been completed, it is picked up by the two cranes in the shop, carried up to a position opposite the door, and one end projected through. The cranes in the next bay then take hold and it is lifted through and placed in position for assembling into the completed crane.

The erecting shop adjoins the girder shop on the opposite side of the brick wall. This shop contains no fixed tools, although there is provided a large supply of portable tools, such as pneumatic riveters, drills, hammers, etc., and is served by two 15-ton cranes of 60-foot span. The trolleys for the cranes are assembled in the bay adjoining the bridge erecting shop, and when completed are brought to the latter department, placed in position, and after the necessary tests are completed, the crane is loaded on flat cars, which are run into the building, and is ready for shipment.

In the trolley erecting shop, all the various parts used in the construction are brought in from the different departments of the main shop and are assembled. A number of tools are installed here for use in the assembling of the trolleys, although, ordinarily, there is but little machine work to be done after the pieces reach this department. These tools are installed along one edge of the bay, mainly between the columns, separating it from the bay adjoining. They consist of two horizontal drills, four vertical drills and a number of lathes and shapers. The horizontal drills were designed and manufactured in the Pawling & Harnischfeger shops, and were described in THE IRON TRADE REVIEW of Dec. 7, 1905. A ten ton traveling crane furnishes transportation for this department.

Heavy Machine Shop.

Adjoining the trolley assembling shop is the heavy machine shop. At one end of this bay are four large lathes for turning and boring drums and other heavy parts of the cranes. The drums are bored by mounting them on a special device fastened to the lathe carriage, the boring bar being revolved on the lathe centers. The machines in this department are all grouped, similar machines being placed close together. Adjoining the heavy lathes are seven planers of various sizes, which are placed with their center lines perpendicular to the line of columns. All the tools are arranged in this manner, perpendicular to the wall instead of parallel to it, as is the usual custom. This is made possible by the peculiar arrangement of belting, which will be described later.

In addition to the planers there are installed three milling machines of the universal, plain duplex types, respectively. Beyond these is a bank of drill presses, and two drilling machines, similar in character, but larger than those installed in the trolley erecting shop. The equipment of the adjoining bays is similar in character, and consists of drills, shapers,

FIG. 5.—PLANER DEPARTMENT IN MACHINE SHOP OF PAWLING & HARNISCHFEGER.

boring mills, lathes, etc., all grouped together. In one portion of the shop there are a number of automatic gear cutters of various types, some built by Brown & Sharpe, others by Gould & Eberhardt and still others by Pawling & Harnischfeger, in their own shops.

High speed steel is used exclusively throughout the plant; not only is it used, but it is driven to its limit. An instance of the heavy work done by this steel is as follows: One of the gear cutting machines had in it, at the time of the writer's visit, a gear blank about 16 inches in diameter. The teeth being cut were about 1¼ inches deep and two inches pitch. The entire amount of metal between the teeth was taken out in one cut, and the cutter was being fed through the work at the rate of 1¼ inches per minute. This is extremely rapid work even for high speed steel.

A great many duplicate parts such as screws, washers, bolts, nuts, bushings, etc., are made, and one bay is almost entirely filled with turret lathes for the manufacture of these articles. The tool room is situated at one end of the center bays. It is separated from the rest of the shop by a low fence surmounted with wire netting. In it are installed a large number of machines such as lathes, planers, shapers, grinding mills, milling machines, etc., for the manufacture and repair of tools. At one side of the tool room is a small blacksmith shop for the dressing, hardening and tempering of tools.

Adjoining the blacksmith shop is the grinding room. It is a matter of the utmost importance that the driving wheels of the cranes be of uniform diameter and perfectly round. Should one wheel be larger than the other at the opposite end of the same shaft, that end naturally would travel faster than the other, thus putting a strain on the bridge of the crane which might damage it seriously. The traction wheels used are, therefore, ground accurately to size. This is done in a special machine illustrated in Fig. 9. The wheel is mounted at the end of a shaft, which is slowly revolved by a belt from the counter-shaft. The grinding wheel is on a shaft, which is so arranged as to have a motion across the face of the wheel being ground. The machine is extremely sensitive, and perfect accuracy is secured in the wheel. A suction system, operated by two small fans, removes all dust from the room, and makes it an extremely agreeable place in which to work.

FIG. 6.—GEAR CUTTERS AND SHAPERS IN MACHINE SHOP OF PAWLING & HARNISCHFEGER.

Electrical Department.

The last section of machine shop is occupied by the electrical department. This company manufactures all of the electrical equipment used on its cranes, including motors, controllers, etc. A view of the armature assembling department is given in Fig. 7. The armatures are hand wound at benches shown in the foreground. Directly across from these benches are lathes for turning up the commutators of the motors. The field magnet coils are wound and assembled in this department, and the controllers used on the cranes are built and assembled further down the same bay.

At the far end of the shop is the motor and controller testing department, where all the electrical equipment is thoroughly tested before being assembled on the cranes.

General Features

Each bay in the main shop is spanned by a crane of the proper capacity for the work done in this section. A narrow gauge, industrial railway encircles the shop, running through the electrical department, along the outer edge of the bridge shop, and across the two ends of the building. It is not necessary for it to run into each bay, as the crane runways in all sections of the shop extend over the tracks, and the crane can pick work up from the cars, and transport it to the different points at which it is required.

Mention has been made of the system of belting and shafting in use in the machine shop. This system is illustrated in Fig. 8, and is the group system of driving refined to the last degree. On both sides of alternate columns in each row is a shelf erected about six feet from the ground, on which are placed motors belted to a

short jack shaft between and perpendicular to the center line of two adjoining columns. This jack shaft drives, by means of short belts, the countershafts of the various machines, which are installed between the columns. The countershafts and jack shafts are

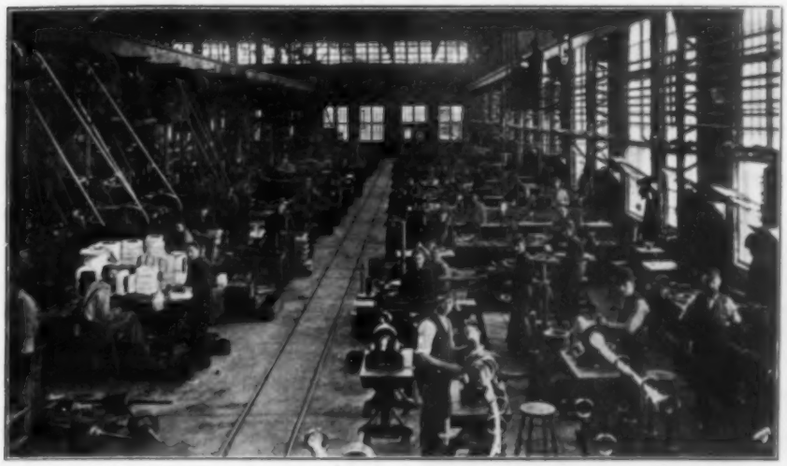


FIG. 7.—ELECTRICAL DEPARTMENT, PAWLING & HARNISCHFEGER.

suspended by hangers from Z-bars, which are riveted to the lower side of the crane runways. The total length of these Z-bars is not over eight feet. This method of driving allows the machines to be placed perpendicular to the side walls of the shop, and results in considerable economy of space by making available that portion of the shop between the columns, which would usually be wasted. It also keeps the belts from underneath the cranes, and allows the trolleys of the latter to extend directly over the

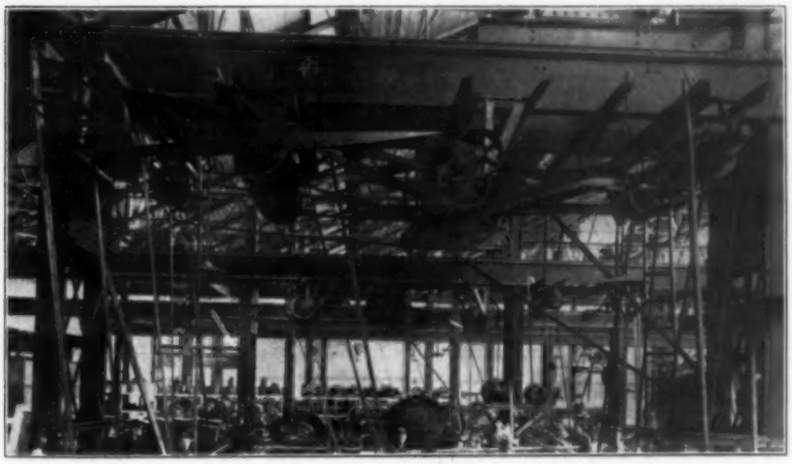


FIG. 8.—SYSTEM OF BELTING IN USE IN PAWLING & HARNISCHFEGER'S SHOPS.

machines, making it possible for the cranes to place heavy work directly in position.

At the end of the machine shop facing the office are the store room, shop office, and the emergency room. The store room is plentifully provided with racks and bins of the type illustrated in THE IRON TRADE REVIEW of Feb. 15, 1906. The company aims to keep a large amount of each class of material on hand, so that there is never any delay in filling a requisition. The system of bins used allows a great deal of small material to be piled up in a little space. The store room is unusually orderly and well kept. It consists of two portions, a floor being built over this end of the shop forming a gallery. Heavy materials are stored on the main floor, lighter articles being in the gallery, with elevators joining the two portions.

The emergency room contains a complete surgical outfit, operating table, invalid chairs, in fact, everything that is necessary to take care of men injured about the works. Happily there is little occasion for its use.

Pattern Shop.

The pattern shop, which is located in a separate building, immediately adjoins the pattern storage house. The former is one story in height, the latter three stories. The interior is shown in Fig. 10. It is an exceedingly well arranged building, the benches for the patternmakers being arranged perpendicular to the walls, and alongside the windows, thus insuring good light. The power tools, such as buzz saws, band saws, planers, etc., are installed in the center of the room, and are driven from a line shaft running underneath the floor. The pattern store house is separated from the pattern shop by a fire wall and fire doors. No special precautions have been taken to render the store house fireproof, other than the installation of automatic sprinklers, in conjunction with slow burning construction.

Foundry.

The foundry is separated from the machine shop by a storage yard about 85 feet wide. The building is 107 by 150 feet, with two extensions used for a coke shed and the receiving shed. The cupola is of 15 tons capacity, and is installed at one corner of the building. Blast is furnished by a No. 5 Root blower, directly driven by a 75-horsepower motor which is located in a room on the main floor of the building and

FIG. 9.—WHEEL GRINDING MACHINE.

adjoining the cupola. The walls of this room are of sheet iron and the floor is of concrete, thus the motor and blower are protected from dust and injury. No molding machines are used, as comparatively little duplicate work is done. The foundry is divided into three bays, the main one being spanned by a 15-ton electric crane, while one of the side bays is equipped with a three-ton crane. Another three-ton electric traveling crane, arranged to be operated from the floor is in service in the casting cleaning room.

Power Plant.

The power house is located at one end of the casting storage yard, and is divided into two sections, the boiler house and the engine room. The boiler room equipment consists of two 250-horsepower boilers, equipped with Hawley down-draft furnaces, and a locomotive boiler. The engine room contains two 200-horsepower Reynolds-Corliss engines, built by the Allis-Chalmers Co., Milwaukee. Each engine is

belted to two generators of 225 and 50 kilowatts capacity, respectively. An additional engine is a 75-horsepower Ames high-speed engine, belted to two 40 kilowatt auxiliary dynamos. A Rand Imperial air compressor of 600 cubic feet free air per minute capacity is located in the room and supplies all the power for the riveters and pneumatic tools about the works. In addition to these machines there are installed in the engine room, in a pit, the necessary boiler feed, and water supply pumps and heater, in addition to a 750-gallon fire pump. The water supply is obtained from an artesian well 500 feet deep, operated by compressed air.

FIG. 10.—PATTERN SHOP, PAWLING & HARNISCHFEGER.

A 75,000-gallon storage tank serves a system of fire hydrants distributed about the works.

GERMANY'S IRON OUTPUT.

The returns of the association of German iron and steel producers presented by the *Iron and Coal Trades Review* of London, show that the output of pig iron in December amounted to 1,029,084 metric tons, as compared with 988,000 tons in the preceding month and 871,194 tons in December, 1904. The total production of pig iron in the past two years has been as follows in metric tons.

	1904.	1905.
Foundry pig	1,865,599	1,905,668
Bessemer pig	392,706	425,237
Basic pig	6,390,047	7,114,885
Spiegel	636,350	714,335
Forge pig.....	819,239	827,498
Total	10,103,941	10,987,623

It will be seen that the total output of 10,987,623 tons in 1905 represents an increase of 883,682 tons over the year 1904. All qualities have participated in the advance, although not in the same proportion. The total production has doubled in the past ten years.

The durability of cast iron is shown by the fact that cast iron water pipes laid in Philadelphia, in 1820, were taken up after 53 years constant service and found in good condition.

INVESTIGATIONS AND COMMERCIAL TESTS IN CONNECTION WITH THE WORK OF AN ENGINEERING COLLEGE.[1]

BY PROF. D. S. JACOBUS[2].

In any school it is necessary, in securing the best efficiency in instruction, that the professors shall be able to speak with authority on the subject which they teach. In technical schools those who teach the practical engineering subjects cannot speak with authority unless they have had practical experience. Investigations and commercial tests may serve to give them this practical experience, and the question naturally arises, is it a good policy for professors to conduct such work in connection with their regular college duties?

Let us consider the various ways in which a professor in an engineering school may acquire the practical experience which is necessary in his work.

First, he may be called to the professorship from the practical field.

Second, after first teaching for a time and finding how necessary a practical experience is in his work, he may turn to the practical field, and then return to teaching.

Third, he may undertake practical work in connection with his college duties, and gain his experience in this way.

Each method possesses its own advantages and disadvantages. Starting with the first, it must be admitted that many of our best instructors have entered the teaching line after they have had experience in the practical field. Such a man has an advantage in being able to make use of this experience immediately when he starts in at his teaching work. There is a disadvantage however in the fact that should he have secured a mature experience in the practical field, he will necessarily be no longer a young man, and it may be hard for him to teach and to properly adapt himself to the theoretical part of his course. Again, if he has made a marked success in the practical field his pecuniary reward may be so great that he would have to make a considerable sacrifice in this respect should he turn to teaching. There are some men who, from their love of teaching or through the influence of high ideals, have been willing to do this, but these are few, and the college obtaining such a man is indeed fortunate. This side of the problem is a serious one from the standpoint of the college, because the man they would like to get may be beyond their reach, and those available may have made only a partial success in the practical field.

If a young man with a limited practical experience becomes a teacher, this will be of assistance to him, but not as much as the more mature experience of an older man. In either case, a professor should not assume that having had a practical experience this is all sufficient, and that it simply rests with him to base his teaching on the results of this experience. To keep in touch with what is going on it will be necessary for him to spend much of his time in studying what is being done in the outside field, or to resort to the third method, and do practical work in connection with his regular college duties. If he does not do this he will soon fall behindhand, and the efficiency of his instruction will be decreased.

The advantages of the second system of securing a practical experience, where the professor leaves the teaching field, takes up outside work, and the returns to teaching, are, that during his practical career he will be very much alive to the points he should look into, and furthermore if he returns to teaching he will possess the advantage of having experience both as a teacher and as a practical engineer. We all know that there is much more to the right sort of teaching than a thorough knowledge of the subject to be taught, and that the old saying "a man must be born a teacher" contains much truth. It is indeed just as necessary that a successful teacher shall have the right qualities as an instructor, as that he shall possess the necessary knowledge. The main disadvantage of the second method is that if a professor makes a success in the practical field his pecuniary reward

[1] Address delivered as vice president and chairman of Section D of the American Association for the Advancement of Science, at the New Orleans meeting.

[2] Professor of Experimental Engineering at the Stevens Institute of Technology, Hoboken, N. J.

may, as already stated, be so great that it will be hard to tempt him back to teaching.

We will now take up the third method, where a professor obtains his practical experience by conducting outside work in connection with his college duties. In the first place, let us consider the subject from the standpoint of the man himself. If he is an enthusiast, this method of obtaining an experience will lead to harder work on his part than either of the others. This assumes that his college work is not neglected, and that by doing the outside work he is making his course at all times better and more useful to the students. In this connection something may be said about the methods of teaching in engineering schools. I believe that the one proper way to teach an engineering subject is for the professor at the head of the department to get down to hard work with his students, and to know each of them so well that he is thoroughly acquainted with their personal characteristics. Certain parts of his course can be turned over to assistants, but the moment he avails himself of the assistance of others to such an extent that he is no longer in close relationship with the students, his efficiency in instruction will be decreased. In other words, the professor must exert himself to the utmost to secure the best results with his students, and when this is done, there is no harder way to gain a practical experience than by the undertaking of outside work, and if the professor is an enthusiast there is often much danger of his breaking down under the strain. On the other hand, if he manages to secure an experience which will give him the reputation of being an authority in his field, he usually will make the best sort of a teacher, and be a credit to the college with which he is connected. All this assumes that the classes are not too large (and I am a thorough believer in comparatively small classes) and also that his teaching roster is so arranged that he will have time available for the outside work. It would certainly be unfair to expect a professor to gain a reputation in either research or commercial work if his time is so fully occupied with class work that, with the exception of his summer vacation, there would be little time except the evenings in which to do such work. One must not be misled, however, in thinking that if some definite time, say a certain number of days each week, is set aside for the purpose that this will make it an easy matter for the professor to undertake practical work. If he is an enthusiast he will find that he must often stand up to his task night after night, and unless he is willing to do this it is folly for him to undertake to gain an experience in the way indicated.

From the standpoint of the college, allowing the professors to undertake any and every sort of work to gain a practical experience is a most dangerous one. There is a tendency in many cases to do work for which the professor has not the proper capacity, and in this way he may throw discredit on his college. There is nothing that will so greatly damage the reputation of a professor, and in turn of the college with which he is connected, as the issuance of a report which shows him to be incapable of properly coping with the subject, or which is in the nature of an advertisement for this or that machine or commodity. The outside work taken by a professor should be that of a scientific or strictly engineering type. In much of the work his reports simply recite facts deduced from various test data, whereas in others it is necessary for him to render an opinion. There is danger in arriving at false deductions as well as in advancing of false opinions, and unless the professor can be thoroughly trusted it would be better to cut out all such work. There is also a great danger of a professor bringing disrepute to his college if he is careless in his testimony as an expert. If his testimony in this line is wilfully misleading, or if he depart a hairbreadth from truth, it were well that he had never been given the chance of lowering the dignity of his profession. On the other hand, a strictly honest and able man may bring credit to his college by his success and acknowledged fairness in this same line of work.

The advantage to a college in having its professors do research and outside is, that what reflects to the credit of the professor will reflect to the credit of the college. Furthermore, the college will be looked to as a source from which an unbiased opinion can be obtained, and in maintaining this standard it will be fulfilling a high and useful mission. The results of the investigations may be made the subjects of scientific papers to be read before the various societies, and any reputation that a professor gains in this way will benefit his college. Furthermore the college gains through the acquisition of much of the apparatus used in the investigations. The college will also be the gainer financially, because if a professor is allowed to do professional work what he receives from this source really pays a part of his salary. Aside from a financial gain in this way, however, it is a question whether a college should endeavor to secure any great financial return for such work. There should be enough earned directly by the college to pay for the use of the apparatus, the wear and tear, etc., and for providing a fund for the purchase of new apparatus for the work; but aside from this, it is my opinion that the college need not be the financial gainer. I say this because if too much stress is laid on the money getting side of the problem, it will not be possible to do the right sort of work, and to do it in a proper way. A party may be willing to pay a large sum for an investigation of a project where it is evident that no matter what results are obtained they will not add to the scientific knowledge of those undertaking the work, and where it is also evident that all that is wanted is the name of the professor, and that of the college with which he is connected, for promoting the project. Such work should never be undertaken no matter what the commercial returns may be. On the other hand, a poor inventor may desire to have a test made on some machine which he has constructed, and in which there appears to be a possibility of development, and such a test might well be undertaken although it may give no financial return. The proper sort of commercial work to do in connection with a college is that of a research character, or where scientific results are obtained. It will be found that when the work is limited to this sort that it often cuts off much that is of a less desirable nature, but in which the financial returns would be greater.

In all that has been said so far it is assumed that it is necessary for certain professors to have an experience in the outside field. I do not think any one will question this. One is apt to get into a rut in teaching and to have his mental horizon narrowed so that he cannot perceive his own faults, and there is no better way of expanding this horizon than to be a co-worker with practical men. The main advantage that a practical teacher has over one who is purely the official is that he can make his course interesting by the introduction of practical examples, and in this way incite the students to study intelligently, which is the real measure of his success. He may, however, make the mistake of introducing too many practical details into the course. It is essential above all that the fundamentals of the subject shall be mastered, and the true use of practical problems, aside from securing the interest of the class, is to show that their solution is based on a few broad underlying principles. A practical man may also make a mistake in thinking

that his way of looking at a problem is so simple and straightforward that it will surely be grasped by the students. In teaching, however, he will find that after presenting a subject in what he considers a way that all must understand, there will be many, possibly the majority of the class, that have failed to grasp his reasoning. Men's minds work differently, and the path taken to arrive at the understanding of a problem will vary, so that unless a subject is presented in several ways the explanation given by a professor may fail to fall into the line of thought of many of his students, and he will be disappointed in the results obtained.

It is a fact, however, that there are many professors who have had little or no outside experience. This often occurs where a young man enters the profession of teaching directly after his graduation, and is placed in such a position that it is impossible for him to undertake any practical work. Such a professor may make the best sort of a tutor, and may be most successful in imparting the fundamentals of a subject, but when it comes to being put in charge of a practical engineering department, it is here that his lack of experience will be very much felt. In a certain sense it is unfair for a head professor to secure the services of a recent graduate and keep him continually at teaching so as not to allow him to gain outside experience. Much thought has been put on this phase of the problem. Mr. Walter C. Kerr, in connection with his work as a trustee of Cornell University, has been in favor of the plan that a professor be thrown upon his own resources and be compelled to work in the practical field one year out of seven. This might appear all right from a business standpoint of the college involved, but how about older professors, who have worked long in the teaching line and have not had the necessary experience to qualify them for taking a position in the practical field. It might be very inconvenient for such a professor to have to accept a nominal salary in order to gain experience, but this certainly would follow if he had been so loaded down with teaching that he was given no opportunity to work at the practical side of his profession. On the other hand, if a professor through hard work and diligence has obtained experience in the outside field while he is a teacher, and is forced, at the end of seven years, to enter the practical field, it is very probable that his success therein may be such that he could not be tempted back to teaching.

From the foundation of the Stevens Institute to the present time, the professors have been encouraged to do practical work. At all times this work has been done on their own responsibility, that is, the institute was not responsible for any of the reports given out. On the other hand, it has been well appreciated that should erroneous or undignified reports be made it would reflect discredit on the institute, and great care has been taken that this should not occur. In 1894 the late Dr. Morton, who as you all know, was the first president of the institute, established what he called the Department of Tests, the aims of which he described as follows:

"It is part of the institute's policy to make its laboratories and workshops the center of such experimental investigations as will be of direct commercial importance to the mechanical engineering profession, and likewise contribute to the same valuable technical information by which the knowledge of facts and principles which constitute the foundation of that profession may be enlarged. It is also part of the same policy to have its professors so in touch with the most advanced practice as to enable them to embody, in their courses of instruction, the best results of applied science in engineering practice.

"A Department of Tests has, therefore, been organized to undertake measurements of the performance of steam engines and other motors, and of the efficiency of boilers, refrigerating machines, and mechanisms generally, including electrical and hydraulic apparatus, also to make tests of strength of materials, and to make various chemical and physical investigations, for the general public. Such work is assigned by the president to the member of the faculty best fitted to successfully undertake any particular investigation, and the extensive facilities of the institute in the way of working space, apparatus, workshop appliances, skilled observers, and mechanics are placed at the latter's disposal."

This might make it appear that all testing work from that time on was to be done by the institute as an institution, but such was not the case. No other than personal reports have been issued by the professors who have undertaken the work, and in every case the professors themselves have been entirely responsible for the payment of all expenses connected with the tests. In many cases the expenses of tests are quite large, and the payment of these must be secured either by obtaining a retainer or deposit from the parties for whom the work is to be done, or the professor making the test must run the risk of having to pay these expenses himself should the parties for whom he is doing the work fail to meet their obligations. This looking after the financial end of the problem is an essential one as it gives the professors experience on the commercial as well as the engineering side of the work.

It has been claimed that the professors of an engineering college should not do work in the practical field as this interferes with the consulting engineers who depend for their livelihood on just the sort of work which would be apt to be undertaken at a college. This is a very narrow view to take of the matter, and as far as my own personal experience is concerned, I can testify to the fact that much of the work undertaken in connection with my college duties has been done for consulting experts. The day is passed when there can be a strict line drawn between the work of the consulting engineer and that of the professor who teaches in the same field. The ideal professor in a given line should be able to take up the work of the consulting engineer in that line, and the ideal consulting engineer should possess enough technical knowledge to fit him for being a professor. There should be no jealousy but rather a bond of friendship in the fundamentals which each should master are the same.

CONNELLSVILLE COKE REGION.

Uniontown, Pa., Feb. 24.—The situation in the Connellsville district tends to an era of better prices. The demand has been good; the operators who have been offering spot coke on the market have sold their surplus, and today, standard Connellsville furnace coke is bringing $2.35 to $2.50 and standard 72-hour foundry coke about $3.00; both f. o. b. cars at the ovens.

Several large western smelters have made large purchases of high sulphur Connellsville coke recently.

The miners of the Buffalo, Rochester & Pittsburg district were out on a strike for several days and considerable coke was bought in the Connellsville region to keep the furnaces in that section running until the matter could be settled; this has been done amicably and the men have agreed to return to work.

It was rumored that the H. C. Frick Coke Co. was stocking coke in its yards in anticipation of the bituminous strike, but upon investigation this was found to be incorrect.

The average weight of one bushel of anthracite is 86 pounds.

CANADIAN INDUSTRIES.

Henderson Company Reorganization Assured.—New Mining Developments.

(Special Correspondence.)

Toronto, Can., Feb. 26.—The reorganization of the Henderson Roller Bearing Co., proceedings for the winding up of which are now pending, has been practically assured. When the case came up before Chief Justice Falconbridge, Feb. 20, N. W. Rowell moved for a further enlargement until March 12, stating that $60,000 of the $75,000 necessary for the reorganization had been subscribed, and that the balance of $15,000 would be forthcoming. The motion for an enlargement was granted.

The Moose Mountain Mining Co. will proceed immediately to put on a large force of men to open its iron ore deposit at Moose Mountain, Hutton Township, Ont., having contracted to have a large amount of ore ready for shipment by Jan. 1, 1907. This deposit, which is exceedingly rich and extensive, lies about 25 miles north of the town of Sudbury. Prof. C. K. Leith, of Wisconsin, who made a detailed examination of the area in 1902, reported numerous exposures of magnetite ore varying from lean to high grade, the formation of the Moose Mountain range being similar to that of the Vermillion iron districts of Minnesota. A considerable amount of the ore runs about 58 to 60 per cent in metallic iron. Sulphur is present in very small quantity, a considerable number of analyses showing only from 0.01 to 0.08 per cent, while titanium is altogether lacking. "The ore," says Prof. Leith, "is hard and crystalline, and because of its crystalline character will crush to a good size for furnace use. It will doubtless be found to serve admirably for mixing with soft ores such as the Mesabi." The deposit has remained unproductive on account of its inaccessibility, but this drawback has been overcome since Mackenzie and Mann, the Canadian Northern railway magnates, acquired an interest in the Moose Mountain Mining Co. The James Bay Railway, now under construction between Toronto and Sudbury, which latter point had been fixed upon as the terminus for some time at least, will be continued 25 miles north of that town, from which a short spur will be built to the mine. The James Bay Railway Co. will also build a branch line from a point on its main route near French River to some suitable harbor on the Georgian Bay, whence the ore can be shipped to the smelters. The haul from the mines to Georgian Bay will not exceed the average rail haul of the Lake Superior ores, while the distance by water from the Lake Erie consuming centers will be so much less than the distance to be covered from the Lake Superior ports, as about to counterbalance the American duty in cheapness of freight should a market be sought in the United States.

The Dominion Steel Car Co., which as previously stated has obtained a contract for 500 gondola steel cars from the Canadian Pacific railway, will at once erect a large plant in Montreal west, with buildings 750 by 150 feet, where from 400 to 500 men will be employed. It expects to begin work on its contract in June. The increased cost of timber for wooden cars has given a stimulus to the demand for steel cars.

The Canadian Ship Building Co. will build a large steel freight steamer at its yards at Bridgeburg, Ont., for the St. Lawrence & Chicago Navigation Co. which will be placed on the upper lake route. The measurements have not yet been decided on, but it is understood that she will be in the 10,000-ton class, and be ready to go into commission in the spring of 1907.

The following companies have been incorporated: Dominion Stove & Heater Works, Ltd., Montreal, $500,000, incorporators, Llewellyn E. Kimpton, H. L. Mitchell, Richard T. Heneker, Wm. C. Stachan and Walter G. Mitchell. Sheldons Ltd., Galt, Ont., $200,000, heating systems, and general foundry business, incorporators Wm. D. Sheldon, Sydney R. Sheldon, Juliet M. Sheldon, Wilfred H. Sheldon and John R. Blake.

A LARGE CASTING.

The Westinghouse Machine Co. has recently completed a casting of a bed plate for a horizontal tandem, double acting, gas driven blowing engine which it is constructing. This bed plate consists of two castings, the combined weight being 162,000 pounds. The casting was made in two parts to facilitate handling in shipment and during the erection of the engine. Also for the purpose of avoiding danger from unknown strains in a very large casting, which might result if the bed were cast in one piece. We are indebted to Mr. W. A. Bole, manager of works, for the photographs and description of the work.

FIG. 1.—MOLD WITH COPE AND CORES SUSPENDED.

The Westinghouse Co.'s foundry has a capacity of melting and handling 200 tons of iron in the Trafford foundry for any given casting, and hence it was for no reason of foundry limitation that the casting was divided into two parts. It was considered, however, that it was better designed when divided and that it would facilitate handling both in the shop and during erection. As it was the pillow block section of the casting weighed 96,000 pounds and required a special heavy railroad car for its transportation owing to the fact that the side on which the shaft bearing is located is much heavier than the other and the casting itself was so wide that the center of gravity of the casting could not be located over the center of the car.

The two castings forming the bed are very securely fastened together by shrink links on the outer edges, as shown, and by a large number of substantial bolts passing through the heavy flanges on the interior sides of the

crank pit. In addition to this, an enormous steel bolt located directly above the shaft and running through the jaws of the main pillow block, extends back into and is keyed to the slide casting, and this, being located on the same side of the bed as the shaft thrust, the design is thought to be enormously strong.

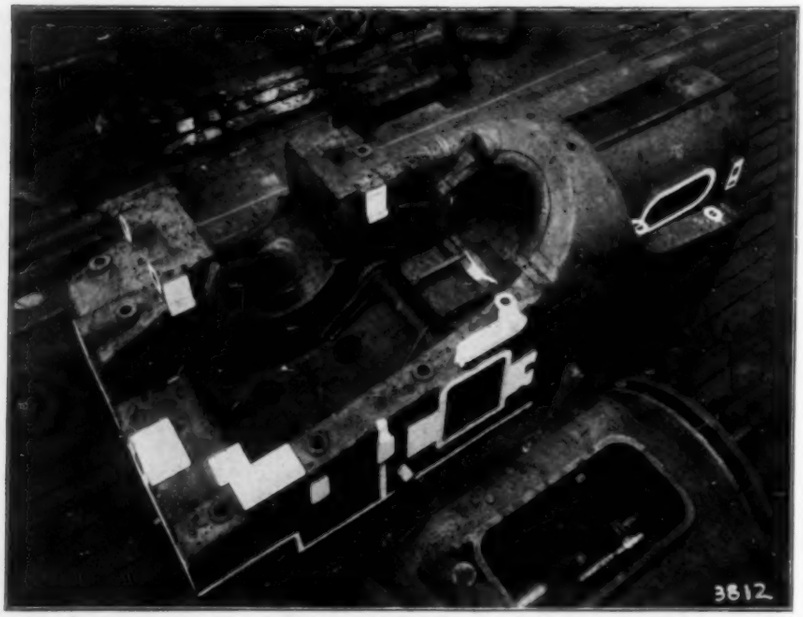


FIG. 2.—GENERAL VIEW OF TWO CASTINGS.

The pillow block portion of this bed, as above stated, weighed 96,000 pounds, and the slide portion 66,000 pounds. They were cast of air furnace iron showing a high tensile strength, and were very true indeed to pattern.

Fig. 1 shows the flask in which the pillow block portion of this bed was cast; the cope suspended above the flask with the lightening cores hanging in position ready to be lowered down for final closing. As will be noted, there is no brick used at all in the making of these molds, the ordinary heap sand of the floor being used for backing, and a fairly strong facing sand against the pattern, the mold being skin dried by the use of natural gas after being slicked and blackened.

The illustration shows the method of securing the cores to keep them from swaying, and shows how the long cores, which are upwards of 7 feet in length, are securely bolted together to prevent any displacement in lowering which might cause the cores to shift. The cores are drawn up against the cope by hollow bolts through the center of which the core gases are allowed to escape, and the cores are stiffened and steadied by the use of adjustable length chaplets, to give great strength and solidity.

As will be noted, the flask rig is of a substantial character, no wood whatever being used in its construction.

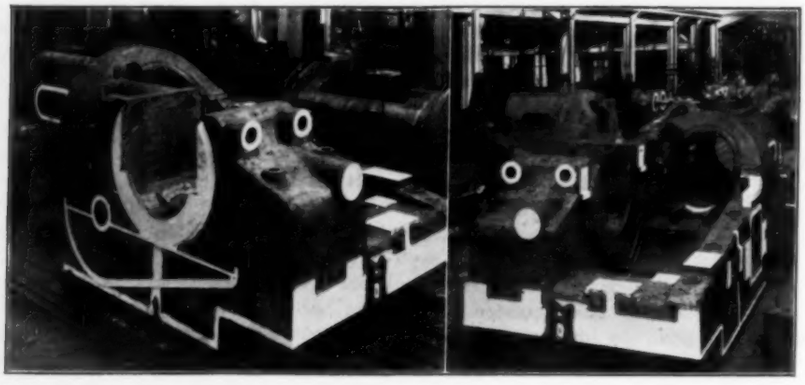


FIG. 3.—PILLOW BLOCK SIDE OF HEAVY CASTING. FIG. 4.—END VIEW OF CASTINGS.

These castings were molded by the use of pneumatic rammers, and, owing to the excellent quality of the work done by these implements, the castings are remarkably free from any swells or blemishes which so often come from soft spots in a mold, produced by imperfect hand ramming.

It is to be regretted that the photographer failed to have a man standing near each of these castings while taking the photograph, so that the observer might judge of the comparative size; perhaps the only dimension which can be used as a measure is the distance between the slots in the surface plates on which the castings rests in the view taken in the shop. These slots are located 12 inches from center to center.

THE UNITED-OTTO SYSTEM BY-PRODUCT COKE OVENS.

The United Coke & Gas Co., of New York, is distributing a treatise on the destructive distillation of bituminous coal, with special reference to the United-Otto system of by-product coke ovens. This is a handsome publication 8¼ x 11¼ inches, 146 pages, bound in leatherette, with gold letters. It commences with a short treatise on coal and its destructive distillation, then describes the three types of apparatus used in the destructive distillation of coal; these being the bee-hive oven, the coal-gas retort and the by-product oven. The bee-hive oven is treated at some length, its construction and operation being described and illustrated, together with its disadvantages. This is followed by a description of the coal-gas retort for the manufacture of illuminating gas, treated in much the same way as the bee-hive oven. Then follows a description of the construction and operation of the by-product coke oven, and as the book is intended to set forth the advantages of this particular type, it naturally gives a great deal of attention to this form. The first section of the description is mainly historical, and the details of construction are taken up and described, together with the various apparatus, which may be used in connection with the oven. A description of the making of coke, the apparatus for the recovery of ammonia, benzol and other by-products follows, after which there is a dissertation on the uses of coke and coke breeze, together with analyses of coke, illuminating gases and other products. The last 25 pages of the book comprise full page photographs of plants where the Otto by-product oven is in use. The book is a handsome publication, well printed on heavy paper and splendidly illustrated. Notwithstanding its advertising character, it contains a great deal of valuable information, and is well worth having.

The blast furnace of the Hudson Iron Co. at Secaucus, N. J., is out of blast pending repairs and extensive improvements being made at the plant. New hot-blast stoves, a pig casting machine and new hoisting apparatus will be built.

STRONG PLEA

FOR CO-OPERATION OF RAILROADS AND SHIPPERS.

Wisdom of Buying in Dull Times—The Universal Car Discussed—Growing Use of Steel in Construction.

At a meeting of the Traffic Club, of Pittsburg, Feb. 12, Mr. L. C. Bihler delivered an address, in part as follows:

I have been asked by the chairman of the committee on entertainment for bimonthly meetings, to make a few remarks on the subject of "Ways and Means to Maintain Car Supply." This is a far-reaching subject, and the question as to what are the real remedies could be discussed for an indefinite length of time; in fact, it seems that there is no one remedy, but a whole series; like Doctor Munyon's medicines, numbered one to perhaps a hundred and, to treat the disease in the proper manner, it might at times be necessary to make combination of the various numbers. There are opportunities for correction, both on the industrial and railroad side, which will assist in preventing shortage of cars, and when this is done, the result will be some improvement in the supply. One feature is deliberate and premeditated overshipment on the part of a certain shipper in supplying raw material to a customer in his eagerness to forward all he can if he has permission to ship all he can produce. This should not be encouraged or tolerated, unless there are good conditions from the standpoint of the receiver which make it necessary, for practical operation, to have perhaps more shipped on one day than he could unload, such as in the case of holidays or an actual strike in sight, which might affect supply; and the same conditions might govern also as regards a stock of material for current consumption. Too often, by far, is the overshipment of certain class of material tolerated by the railroads on the part of certain shippers, and in fact there have been some cases where it has been deliberately helped along by the railroads themselves, and the available car supply has largely been given to the people who have overshipped.

Prompt Repair of Cars.

The question of prompt repair to crippled equipment is also deserving of the closest attention on the part of railroads at all times, since it is a matter of common knowledge that miles of cars are standing on sidings awaiting opportunity to get into the repair shops, when, as a matter of fact, perhaps more than half of the cars could be repaired where they stand if traveling gangs of car repairmen were maintained. It is surely possible, without a great deal of expense to have the slightly crippled cars repaired where they stand, leaving the others to take their turn to get into shops, and in busy times to send to the shops only those cars that cannot be treated outside the shop.

I also wish to briefly touch on the point of maintaining in proper and safe condition freight car equipment at periods when general business is dull, when it can be done at less expense to the railroads. It is a matter of record and repeated fact that, during dull periods, the supply of equipment among many roads is permitted to run down, defects are not remedied, and the effort to always be in shape for any increase in business that comes along is not made until after the increase in business has arrived, when the matter of repairs is more difficult to have performed because of the busy conditions of all branches of labor which come with an increase of business. In other words, the sense of the old rule of "In times of peace, prepare for war" might here be applied, by preparing in times of dullness to have the maxium amount of equipment ready for service at any time required. There have been times in the past when restrictive or prohibitive loading rules were created by the master car builders or motive power departments of railroads, which have been without due regard in some instances for the rights of shippers, or without full and free consultation with the traffic department and operating department, insofar as these rules affected directly or indirectly the maximum load limit, which, if small, particularly of double or triple length or overhang material, increases the given number of cars required to carry a certain tonnage. Any reasonable shipper will always stand for safety first, but hesitates at arbitrary decisions of one department of a railroad alone which are "iron clad," when these carry with them the imposition of additional costs for securing loads, a maximum quantity that may be loaded, and making it necessary to have more cars to carry a given tonnage, increasing the demand of a shipper for equipment at times when liberal, reasonable and safe rules do not absolutely require it. In other words, there is opportunity for practical cooperation between shippers, motive power, operating and traffic departments of railroads

Another feature which might be touched on here is the desirability of the division superintendents or trainmasters keeping in thorough touch with the shippers along their division so as to know what kind of cars he can use for his material.

Another very important point is negligent or careless waste of capacity of cars, something that may be corrected by full co-operation on the sides of the railroads and of the shipper.

A Universal Car.

Referring to the question of proper kind of equipment for the several classes of traffic which move in extraordinarily large volumes, the sense of the times points to the fact that a universal gondola car or composite car will soon be the car of the future. Several years since, one of the large systems provided a large number of gondola cars, with sides 30 inches high, steel underframe and drop ends, cars being about 37 feet 8 inches long inside, which innovation was hailed with delight, because of the conveyed belief to iron and steel shippers that something specified had been done in their behalf by providing something that had never before been attempted; a car peculiarly adapted to carry iron and steel of long lengths without incurring the maximum of cost for blocking such long pieces which customers require, and which the tendency of the trade of later years demands. Bridge sections, girders and light material, are now demanded by the buyers in longer sections than before, all of which has made the long car with drop ends particularly valuable for the shipment of such material. But it was not long until this pattern of car became scattered all over the country because of the large volume of traffic moving from the iron and steel district in all directions, and these cars drifted and continued to drift, notwithstanding an effort to the contrary, into coal, sand, brick, lumber, stone and other trade, until now what was formerly a large supply of suitable cars for long loads has dwindled to a comparatively small supply. This character of equipment has also drifted into the iron ore and limestone trade, and in times of stress and emergency, consignees are willing to accept the material loaded in this class of equipment, rather than go without the material, notwithstanding the large expense of handling the load over side as compared with unloading through a car dumper or over a trestle, which practice is more common and less expensive than overside unloading. It will probably never be possible or practical to entirely limit the use of such equipment to the particular class of trade for which it is peculiarly adapted, consequently the proposition of a composite car or uniform car comes in very nicely, and it is maintained that a composite or uniform car will do its full share in the matter of assistance in maintaining bet-

ter car supply for all that class of traffic which has to move in open cars. The equipment in question is not always capable of carrying the weight capacity indicated; for instance, a car will carry 100,000 pounds of steel or ore, but would only carry perhaps 60,000 pounds of coal, and there is therefore 40,000 pounds weight capacity wasted. The same car also is so long that it does not go through some of the car dumpers used in connection with furnace plants. In other words, the capacity and length of a car dumper were perhaps not given thorough consideration by both interests at the time the railroads adopted this long car. In adopting a universal car, attention must be given both by the shipper and receiver and carrier to the extent that one will not recommend nor will the other undertake to build equipment which he knows will not be satisfactory for any specific purpose at a period later on. One of the roads in this district has recently taken a step in undertaking to provide a car which goes towards filling the bill for universal gondolas. Information received is to the effect that several thousand new cars have been purchased covering some of the good points of the modern open car of the recent past, but not all of them. The length of the car in question is 41 feet inside, capacity 100,000 pounds, height of sides 50 inches. This car was designed on the belief that in adopting this pattern, less weight capacity would be wasted, and therefore maximum use of equipment, and a more far-reaching maintenance of supply would be reached by its use than otherwise. It is figured that a car of the dimensions indicated will carry full weight of coal to the extent of its marked capacity, and will also serve for iron, ore, coke, limestone, sand, brick, ordinary lengths of steel, pipe, lumber, clay or any other open car commodity. This car however, without drop ends or drop doors, is less valuable than a universal car that is provided with hoppers and drop end gates. For long pieces extending over two or more cars, load would be superimposed at extra cost to shipper for blocking, and master car builders' rules would restrict loading weight.

The modern freight car of today is a car built wholly of steel or with steel underframe, insuring maximum safety to property and life, with a minimum of cost for maintenance and repairs. One of the large systems of the country has served notice that on and after Jan. 1, 1907, it will not accept for transportation any cars not up to its standard of construction. A second large system which recently intended to place an order for 20,000 or more freight cars, having in mind steel or partial steel construction, was so late in placing the orders that, to get the equipment at all, it had to take a wooden car. Since then, however, information received is to the effect that half of the order for wooden cars has been canceled, principally with the idea in mind of securing a more durable car.

The Financial Problem.

It has been contended that the financial influences of Wall street have debarred railroads from spending any considerable sums of money for rehabilitating equipment and motive power during periods of depression, but it is a question whether, if, as has already been recommended by other prominent concerns interested in the general prosperity of the country, a specific sum was set aside each year out of the gross earnings for the specific purpose of creating a fund out of which to pay for the repair of crippled equipment, purchase of new equipment to replace destroyed cars, and also to maintain an ample supply of serviceable motive power and equipment, increasing as the business of the road grows, financing would not be easier and the action of the operating departments of railroads gradually be made to feel less and less the influence of the financial factors in the east. That is to say, a road which continues year in and year out to maintain its standard of motive power and equipment for its legitimate and increasing needs, should have less trouble financing extraordinary sums, and the road that is ready at all times to take what comes along is the one which best serves the financial interests in the long run. Additional to this is the fact that if repairs and new purchases are made during dull periods, the orders can be executed with much greater despatch by the car shops and locomotive shops, the steel and other material can be more promptly and satisfactorily delivered by the makers, and above all, the cost will be less. In addition, this plan will create traffic business for the railroads in the shape of the raw material needed for the manufacture of steel and cars; in other words, extremely hard times should disappear. Suspension of purchases by railroads during depressed periods means a suspension in movements of raw material and a forced decrease in earnings, all traceable to inactivity of the unwilling purchaser in dull times.

The Modern Standard.

Within a few years the time will be here when the large systems of the country will all refuse to handle cars unless up to modern standard of construction as to suitability, safety, etc., and it is not impracticable to assume that some day perhaps legislation may be enforced requiring at least certain standards of construction. The modern steel car costs considerably more than a wooden car, but its life is greater; therefore, when considering the purchase of new equipment and the desirability of having it with a modern standard of construction, why should not such new equipment be designed as far as possible with the idea of taking care of the greatest possible variety of different kinds of loads offered, thus going a long way towards the question of maintenance of a supply of freight car equipment? In 1905, railroads of the United States placed orders for about 350,000 freight cars, two years' work for all the combined car shops of the country. It would be interesting to know of these 350,000 cars how many were based on designs planned after full and free consultation with the traffic departments of the railroads. With the idea of furnishing cars that could handle the greatest possible varieties of kinds of loads, the traffic departments of the railroads have the means at hand of canvassing the shippers and receivers to know what classes of trade they have in large volumes and what kind of a car is best adapted to move it. It would be equally interesting to know how many master car builders, motive power, mechanical, engineering and operating departments of the roads which ordered this large lot of equipment consulted traffic departments or shippers or receivers for ideas as to universal cars. Is there not room here for the best kind of co-operation between the traffic departments of industrial concerns, traffic departments of railroads, master car builders' departments, motive power departments, mechanical engineering departments and operating departments, each with the other, on vital questions like this? If we follow the old "saw" of trying to do the greatest good to the greatest number in what we are planning for the future, will not something great and good have been accomplished? If the carriers of the country will take advanced steps to meet legitimate needs of the growing trade of this great country, and place themselves beyond just criticism of the public, we will probably hear less of that class of railroad lesislation which threatens to penalize the railroads if they do not deliver empty cars ordered for shipment within a given number of hours.

The Demand for Cars.

It is figured that there is a deficiency in freight car equipment in the country today of over 200,000 freight cars. The estimated tonnage of the greater Pittsburg district for the year 1905 was in the neighborhood of 100,000,000 tons, which is an increase of some 132 per cent over the figures for 1897, a period of eight years, yet who will venture to say that the transportation lines have increased the supply of equipment anywhere near the increase of tonnage in the same length of time? We

occasionally hear report of a plan to pool the freight car equipment of the country, in order to handle seasonable business, there being certain commodities which move in certain sections of the country only at certain periods of the year, while in other sections and at other periods, another commodity reigns, and it may not be a bad condition when that period arrives when railroad equipment generally throughout the United States can be made interchangeable. The question is now receiving considerable study at the hands of a number of the larger railroads.

Incidental to all this is the all-important question of sufficient motive power available at all times to keep cars moving, since the faster they move and are transported to destination, delivered and reloaded, and the given time for a round trip reduced, so many more round trips can a car make, all of which will also increase the supply. Equipment is, of course, practically valueless without sufficient motive power in first class condition with which to move it; consequently, the question of motive power is a prime factor in the entire question of maintenance of supply of equipment.

Meantime, until some better condition it arrived at, if there is more general and actual co-operation between the railroad, the shippers and the consignees, particularly on the lines indicated above, some good will surely be bound to come therefrom.

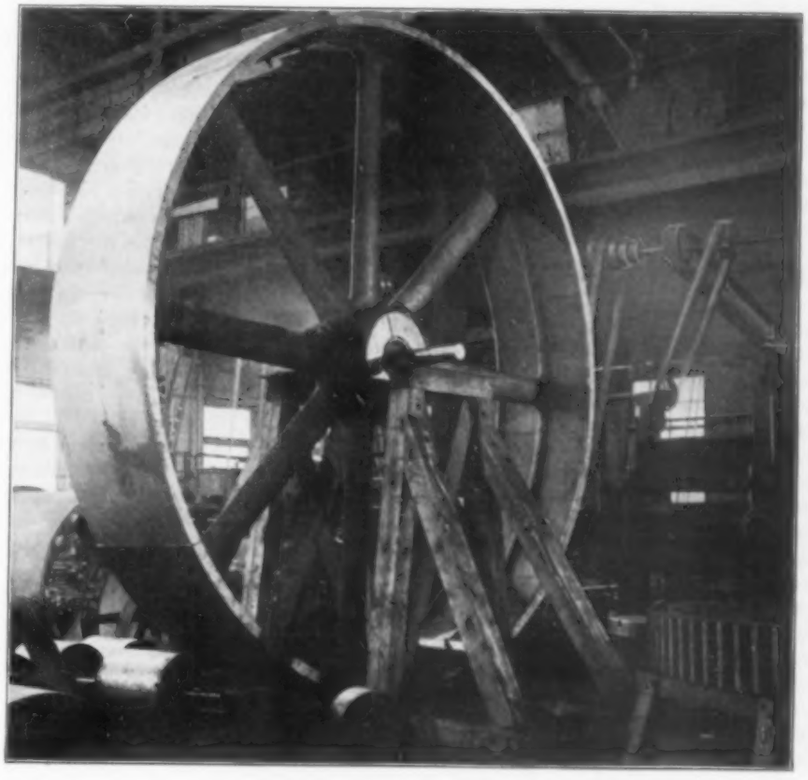
The annual statement of the Dominion Coal Co., of Sydney, N. S., shows that while the output of coal had increased from 3,023,522 tons in 1904 to 3,189,657 tons in 1905, the net earnings had diminished from $1,620,475 to $1,573,838. This was accounted for by the largely increased requirements of the Dominion Iron & Steel Co., the contract with which, it is stated, was not a remunerative one. The expenditures on capital account were heavy, amounting to $497,605, including the purchase of 150 50-ton steel cars at a cost of $162,000. The dividend to holders of common stock was passed.

Calcium Steel.—Consul General Mason of Paris, reports a product made in France, known as "Calcium Steel." This contains no steel or metal of any kind, but is a ceramic product made by baking in an oven, a paste of finely pulverized feld spar sand and lime in certain specified proportions. The material is called steel, on account of its hardness, and a certain toughness which it possesses, which permits boring, cutting, planing or polishing, which properties usually belong to metal.

CASTING ONE-HALF OF A WHEEL.

The duplication of a small casting is not a serious problem, nor does the ordinary foundry hesitate to take a contract for the production of a large casting of specified size, but to produce one-half of a casting to replace a broken piece is a more serious problem. The H. W. Caldwell & Son Co., of Chicago, has recently taken a contract along this line, and fulfilled it remarkably well. A large band wheel, or fly wheel had been cast, and finished up for an engine. While the engine was being erected, one of the halves was accidently dropped into the pit and broken. The wheel was of the planed joint type, so that the halves had been cast as separate pieces. Drillings were first secured from the half wheel, which was still intact, analyzed, and a mixture calculated which would give the same shrinkage as that possessed by the iron in the uninjured half. The mold was then made in loam, with the hub and arms in cores in the usual way. One of the accompanying illustrations shows the casting in the cleaning department, just as it came from the mold. The new half was first planed and drilled, after which it

ONE-HALF OF WHEEL AS IT CAME FROM THE MOLD.



WHEEL ON BALANCING HORSES.

was bolted to the old half, the parts placed on a 20-foot boring mill, and the new portion turned up and bored out to correspond to the old portion. The wheel was then placed on the balancing horses, as shown in the other illustration. The remarkable part of the whole job is that while the wheel was 18 feet in diameter with a 42-inch face and a 15-inch bore, and weighed 27,806 pounds, it was only 94 pounds out of balance, the new half being 94 pounds lighter than the old half.

BRITISH IRON MARKET.

Wage Advance Small as Result of Old Contracts Holding Over.

(Special Correspondence.)

Birmingham, Eng., Feb. 14.— The Midland Wages Board has declared an advance in wages of 2½ per cent, raising the rate for puddling to 8s 9d per ton. The modesty of this advance rather surprised the trade, nearly everybody expecting 5 per cent. It means, of course, that old contracts are still largely prevailing. A similar advance has been given in the north of England. The rise gave increasing firmness to the market, and may be partly accountable for the undoubted slackening off in demand during the past week. The "boom" conditions for finished iron generally have disappeared, though ship building and wagon building continue very active. Iron masters on 'Change on Thursday were inclined to be nervous over the slackening of orders, practically all the mills now clearing the order books twice as fast as they are replenishing them. The position was tersely put by one iron master, who said, "high values mean caution." The trade is once more speculating as to whether the summit of the improvement has not been passed; but the necessity to answer this is not urgent, everybody having plenty of work for some time to come. Even the constitutional pessimist will not spring any concession in price.

We have been swamped with trade statistics during the last fortnight. The Board of Trade returns are very satisfactory, especially in regard to galvanized sheets, for which we seem to be getting an ever widening market. Statistics collected by the trade are equally satisfactory, and there is some elation over the fact that the output of pig iron has once more passed all previous records. Some association figures have just been got out with regard to the strip trade, which show a very substantial increase over those of last year, although in the earlier period one firm was included which has since gone out of the association. A couple of years ago the strip trade seemed to be hopeless, in the face of mutual competition: now the makers hold a commanding position, and seem to be able to regulate their prices at will. But the people who make these strips into tubes have so far quite failed to combine and are complaining of unprofitable trade.

Stored Iron Increases

The amount of iron in Connal's stores continues disquieting, having increased during the twelve months from 200,000 tons to 731,858 tons. The effect of this large stock was seen a few days ago, when a baseless rumor as to the sale of 30,000 tons of American pig iron into this country caused a rush by the dealers to place their iron on the market, this panic bringing down selling prices to the lowest rate for close upon four months.

Apart from this, trade seems to be in a strong position, and a great many extensions are taking place. One of the most noteworthy is by the Sheffield Forge & Rolling Mill Co., which is putting down mills to increase its iron output by 300 tons per week. Many firms are doing uncommonly well. Big orders are too numerous to mention. The Parkgate Iron & Steel Co., Ltd., has a notable order on hand, the government having placed demands for a large number of gunboat plates 15 feet by 3 feet 4 inches thick, each of which weighs about 5 tons. Messrs. Harland & Wolff, Belfast, may also boast of having on hand the biggest vessel in the world namely, the Adriatic, for the White Star line, which is to have a displacement of 25,000 tons, will be 710 feet long by 70 feet broad, and 50 feet deep.

Big Foundry to Start.

The heavy iron founders are very busy, and an interesting rumor was in circulation last week that the Swan Foundry, West Greenwich, may restart. Some particulars of this firm have already been given. Its roll casting department is known to be profitable. It has a fine connection, and its stoppage has been a big windfall for some other competing firms.

On Saturday, Mr. Kent Smith delivered a lecture before the Staffordshire Iron and Steel Institute on "The Application of Vanadium Steel." Dealing with the commercial value of vanadium steel he said it was not comparable with open-hearth carbon steel, but for fancy steel, answering such purposes as nickel steel, nothing was better than this metal. It is especially useful for tempering and case hardening, and for springs is almost an ideal metal. Its elastic limit is far superior to that of any other metal.

A very interesting visitor to the Birmingham Exchange last week was Mr. Zweigel, one of the directors of the German Steel Supply Syndicate, commonly known in the Fatherland as the "Verband." This syndicate controls the supply of German steel billets to foreign countries and it is significant of much that Mr. Zweigel could not undertake to supply German steel billets to British purchasers before the last quarter of the present year. This will give the British makers a practical monopoly in the meantime.

CANADIAN FURNACE ACTIVITIES.

In the last issue of the *Bulletin* of the American Iron and Steel Association was presented considerable information concerning furnaces of Canada.

Of the four furnaces of the Dominion Iron & Steel Co., Ltd., of Sydney, Nova Scotia, 3 were in blast on Dec. 31. The company is holding its idle furnace in reserve.

The Londonderry Iron & Mining Co., Ltd., of Londonderry, Nova Scotia, has dismantled furnace B, which has been idle for several years. Furnace A ran for 293 days in 1905 and was active on Dec. 31. Foundry iron only was made.

The Nova Scotia Steel & Iron Co., Ltd., has abandoned its Ferrona furnace, at Ferrona, Nova Scotia. It was last active in June, 1904, and will probably be dismantled.

The Canada Iron Furnace Co., Ltd., was not operating its charcoal furnace at Radnor Forges, Quebec, on Dec. 31. During 1905 the furnace ran for 236 days. The coke furnace of the company at Midland, Ontario, was also idle on Dec. 31 for relining. During 1905 it ran for 345 days. It will probably be ready for blast early in March.

Messrs. John McDougall & Co., of Montreal, operated their Grantham furnace, at Drummondville, Quebec, for 48 days during 1905 and their St. Francis furnace at the same place for 285 days. Grantham was idle on Dec. 31 but St. Francis was active. Charcoal pig iron only is made.

The Algoma Steel Co., Ltd., of Sault Ste. Marie, Ontario, had its No. 1 and No. 2 furnaces in blast on Dec. 31. Furnace No. 1 ran 290 days during 1905 and No. 2 was in blast during the entire year. No. 1 used charcoal alone, charcoal and coke mixed, and coke alone for fuel. At the close of 1905 it was using coke alone and this fuel will probably be used during the first half of 1906. Furnace No. 2 used coke only during the whole of 1905.

The charcoal furnace of the Deseronto Iron Co., Ltd., at Deseronto, Ontario, was out of blast on Dec. 31 but ran for 348 days during 1905. Work was resumed on Jan. 18.

During 1905 the Northern Iron & Steel Co., Ltd., did no work whatever upon the furnace at Collingwood, Ontario, which it acquired in September, 1904. It is not likely that work will be resumed during 1906.

GERMANY OPPOSES A TARIFF WAR.

That the present tariff war with the United States is not popular in Germany is shown by the reports of a number of chambers of commerce of that country. The sentiment which is common to practically all these reports is well illustrated in the following from the chamber of commerce of Sonneberg, which represents an important manufacturing section of the empire:

"We must make front against those who incline toward forcible measures in shaping our trade relations with the United States. Such attempts run directly counter to the interests of Germany's industries and German exports, and if these attempts succeed it will take a long time for the Empire to get over it. Although the American prohibitive system and other hardships and unfair treatment incident to the American customs administration put us in bad humor, we must do all that is possible to arrive at an understanding in a friendly way by a decided but prudent course. A country like ours, which makes and must make most strenuous efforts to conquer foreign markets, can not seriously count upon success by adopting a rigorous course in tariff matters. Whoever advocates a tariff war forgets that the 500 million marks of goods we annually sell to the United States come into question; that the relations with our third largest customer will be interrupted for an indefinite time; that once the threads of intercourse are torn it will be a hard task to tie them together again. Finally, such a war-tariff champion overlooks the injury caused to our working population. Our tariff war with Russia in 1893 dealt our economic system severe blows. Our conflict with Canada has seriously decreased our exports to that country.

"What the consequences would be to us in case our trade relations with such an immensely more important country as the United States were to be broken off we need not detail; they are self-evident."

STEEL INGOT AND CASTING PRODUCTION.

The details given below concerning the production in this country in 1905 of Bessemer steel ingots and castings are contained in the last number of the *Bulletin* of the American Iron and Steel Association.

Bessemer steel ingots and castings were produced in 1905 by 45 works located in 18 states and the District of Columbia, as follows: Massachusetts, 2; Rhode Island, 1; New York, 3; New Jersey, 1; Pennsylvania, 11; Delaware, 1; Maryland, 1; District of Columbia, 1; Virginia, 1; West Virginia, 2; Kentucky, 1; Tennessee, 1; Ohio, 9; Illinois, 4; Michigan, 1; Wisconsin, 2; Minnesota, 1; Colorado, 1; and California, 1. Forty-five works in 19 states and the District of Columbia made Bessemer steel in 1904.

There were 9 idle Bessemer steel plants in 1905, located as follows: Massachusetts, 1; New York, 1; New Jersey, 1; Pennsylvania, 3; Virginia, 1; Wisconsin, 1 and Oregon, 1. Of the total 5 were equipped with standard converters and 4 with modified converters. In 1904 nine Bessemer steel works were also idle.

During 1905 one new steel plant was completed and put in operation at Toledo, Ohio. It is equipped with two 2-gross ton Tropenas converters and is operated by the C. E. Sutton Co. It makes a specialty of steel castings.

At the close of 1905 there were two 10-gross ton standard acid Bessemer converters in course of erection at Youngstown, Ohio, with an annual capacity of 360,000 tons of ingots; one Raapke converter at Ford City, Pa.; one 2-gross ton modified Bessemer converter at Avonmore, Pa.; one 2-gross ton modified Bessemer converter at Christy Park, Pa.; one small modified Bessemer converter at Pittsburg; one 5,000-pound Wills converter at Bluefield, W. Va.; one 2-gross ton Adams converter at Wellsville, Ohio; and two 3-gross ton Fisher converters at Menominee, Mich. With the exception of the two converters which were being built at Youngstown, all these converters will make a specialty of steel castings. In addition the erection of a number of modified Bessemer converters to make steel castings was projected at the close of 1905.

The following table gives separately the production in gross tons of Bessemer steel ingots and castings from 1898 to 1905, all made by the acid process. Prior to 1898 Bessemer castings were included with ingots. Basic Bessemer steel has not been made in this country since 1897. In that year about 69,000 tons of ingots were produced at Troy, New York, by the Troy Steel Co.

Years.	Ingots.	Castings.	Total.
1898	6,605,478	3,539	6,609,017
1899	7,582,415	3,939	7,586,354
1900	6,678,303	6,467	6,684,770
1901	8,706,538	6,764	8,713,302
1902	9,125,815	12,548	9,138,363
1903	8,574,730	18,099	8,592,829
1904	7,843,089	16,051	7,859,140
1905	10,919,272	22,103	10,941,375

Nineteen plants rolled or rerolled Bessemer steel rails in this country in 1905, of which 5 were located in Pennsylvania, 3 in Maryland, 3 in Ohio, 2 in Illinois, and 1 each in New York, West Virginia, Georgia, Wisconsin, Colorado, and Washington.

TARIFF REVISION.

Policy of Canadian Leaders is Toward Delay and Advance is Unlikely.

(Special Correspondence.)

Toronto, Can., Feb. 27.—All indications point to the correctness of the forecast, which appeared in THE IRON TRADE REVIEW some time since to the effect that no revision of the Canadian tariff would take place until the session of 1907, and that, should it be made then, there would be no considerable increase in duties. While the manufacturers of the Eastern provinces have been insistent in their demands, and have many supporters among the liberal politicians, the strength and unanimity of the opposition to any further measure of protection developed amongst the settlers of the new western provinces, as well as the farmers of Ontario are a factor that the government dares not disregard. No one conversant with the ways of politicians will therefore, be surprised to find the administration resorting to the policy of delay, and shelving the question for at least a year, especially when so plausible a reason can be given for it as the impossibility of preparing the voluminous report of the tariff commission in time to allow its consideration by parliament. It is now announced that the preparation of this document will be further delayed by reason of an accident to Hon. W. S. Fielding, the finance minister, who having sprained his ankle, is likely to be laid up for an indefinite time.

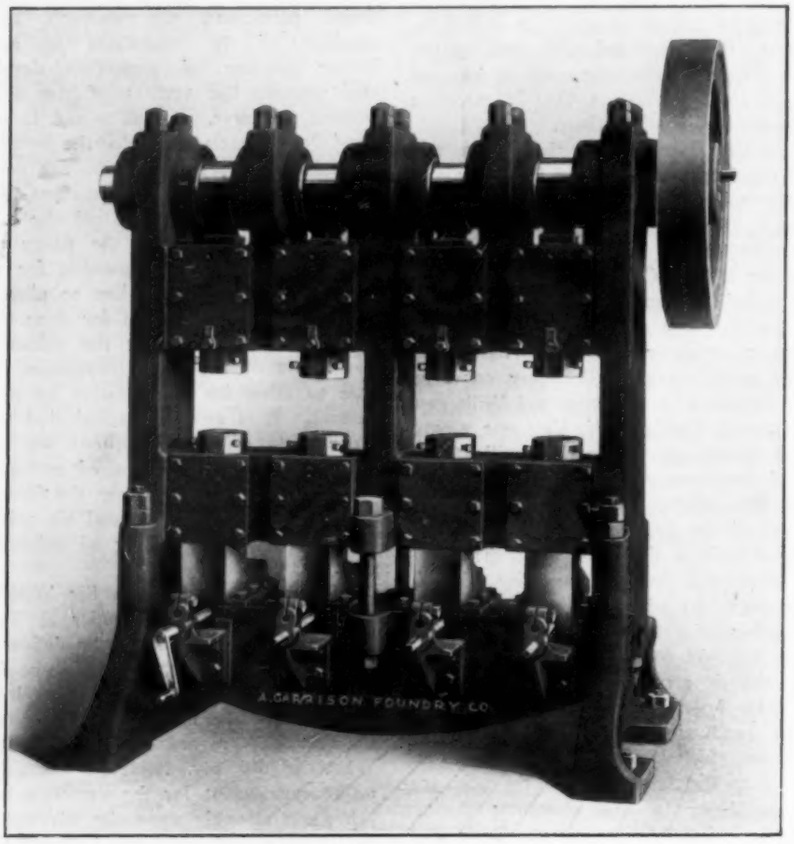
A banquet was given to Sir Wilfred Laurier, the Canadian premier at Toronto, on Feb. 21, at which he delivered a lengthy speech touching with some detail upon tariff matters, but giving little indication of the intentions of his government as regards tariff revision. What he did say, however, contained no encouragement for the Protectionists. He dwelt strongly upon the advantages of stability and condemned "tariff-tinkering," taking credit to his government for the very few changes it had made in the tariff. In view of the labors of the tariff commission and the promise of a general revision of the duties when that body was appointed, the omission of all reference to the matter is a notable one, and tends to strengthen the conclusion that nothing will be done this year at any rate. As to the future the attitude of the west with its largely increased representation and rapidly growing population is likely to be the deciding factor, and so long as it remains as now, wholly agricultural will be an insurmountable obstacle to higher protection.

No welding should be allowed on any steel that enters into structures.

A RAPID BREAKING DOWN PRESS.

The rapid breaking down press shown in the accompanying illustration is built by the A. Garrison Foundry Co., Pittsburg. This machine is used for the manufacture of drop forgings, such as plungers, small crank shafts, steel wrenches, or any other type of forging which requires any amount of breaking down before it is passed to the finishing dies in the hammer.

The frame of the machine is built of special high grade charcoal iron. The rams are four in number and are octagon shaped steel forgings. These



GARRISON BREAKING DOWN PRESS.

are held up in place by a powerful spring and have ½ inch motion, running at about 600 revolutions per minute. The lower plungers are adjustable from below by means of a wedge. The operator arranges the dies on the different plungers, and can then raise the lower plunger to any desired height within the limit of 2 inches, by means of a crank handle which is fitted on the shafts shown projecting from the front of the press.

The machine is furnished with or without a motor, and can be placed alongside the hammer in which the finished work is to be done. Fuller dies of any shape may be used to reduce the bar roughly to the necessary size for drop forging. The use of this machine does away with breaking down work in the hammer, and thus assures a much longer life to the forging dies. It is a desirable machine for use where a small number of special shapes are required, and saves excessive changing of dies.

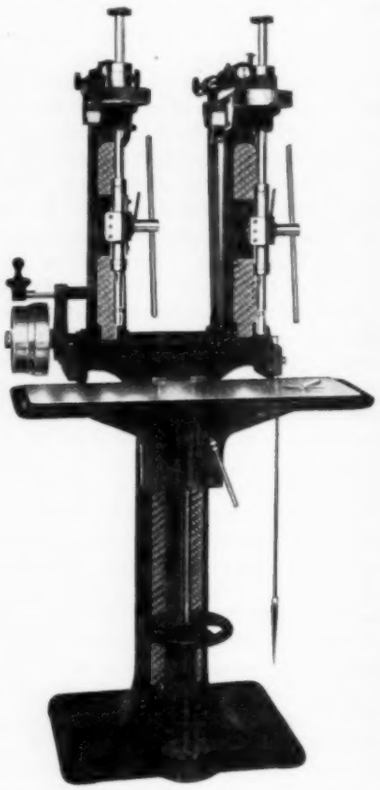
A NEW SENSITIVE DRILL PRESS.

A sensitive drill press embodying new features which allow the operator to increase the output, in some cases, to almost double that formerly possible in this type of machine, has been placed on the market by the Henry & Wright Mfg. Co., Hartford, Conn. Some of the advantages claimed for this machine are as follows:

Accurate ball bearings are used throughout the machine, reducing the friction, which, in many of the former types, consumes as much as 75 per cent of the power used in driving, to a minimum; a new idler system has been introduced, which permits the use of one continuous cemented belt, always kept at the proper tension. This replaces two laced belts, which have no means but relacing for tightening them; a new balanced spindle drive engages the spindle from two diametrically opposite sides, and replaces the former style of feather drive, engaging on one side only. These means of relieving the spindle from all belt strains, the compact design and generally accurate construction, all lend assistance in obtaining the remarkable results claimed by the manufacturer.

The remarkable advance of this new machine is shown by the fact that a 1¼ belt throughout is sufficient to drive a six spindle drill, using high speed drills in sizes up to ¾ inches. These drills can all be driven to their full limit of speed, without any hesitation or injury to the bearings.

The machine here illustrated is one of the latest, and shows a new pinion



HENRY & WRIGHT SENSITIVE DRILL PRESS.

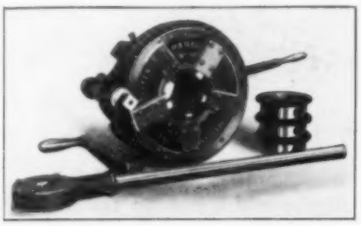
handle which enables the operator to obtain any required leverage, without the aid of thumb screws.

THE HOEFER ADJUSTABLE PIPE THREADING MACHINE.

The Hoefer Mfg. Co., of Freeport, Ill., has recently developed the adjustable hand power pipe threading machine, shown in the accompanying illustration. This machine is adapted to threading pipe of any material. The principal features are: 1st, The dies are fed forward and are withdrawn automatically, cutting the pipe to a standard taper, and leaving the thread cut clean and perfect. 2nd, By a slight adjustment, easily made, the thread can be cut either over or under the stand-

ard size. 3rd. It requires but one set of dies for each size of machine to cut the thread within its capacity. It is not necessary to remove the dies, therefore they cannot be lost. The crank shaft, by which the machine is operated, remains in one position and does not travel around the pipe which is being threaded.

The machine is placed on the pipe and clamped thereon by means of set screws. The large die gear at the front of the machine is turned backward until one of the die plates engages the stop, which is attached to the driving shaft bearing. The small inner pinion



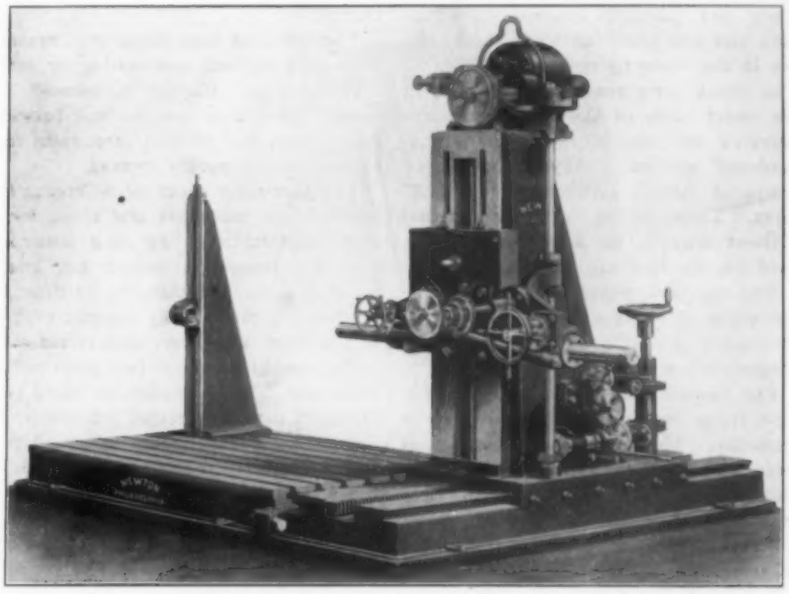
HOEFER PIPE THREADING MACHINE.

is then slipped over the sleeve of the driving pinion, so that it is disengaged from the scroll or back gear of the tool. The scroll gear can then be turned either backward or forward while the die plate is held against the stop. Figures are stamped upon the scroll gear, which indicates the size of pipe to be cut; these are brought opposite the indicator pointer on the frame of the machine. When the dies have been set for the desired size, the scroll gear pinion is replaced on the sleeve and tightened, and the machine is then ready to thread pipe.

When the pipe has been threaded the pinion is disengaged from the scroll gear and the dies relieved and then backed off from the thread by means of the crank. A rachet lever for cutting, and a crank for backing out are furnished for each machine.

HORIZONTAL BORING MACHINE.

The accompanying illustration shows a small horizontal boring machine recently built by the Newton Machine Tool Works of Philadelphia. The spindle of this machine is 3½ inches in diameter and has an automatic feed of 25 inches. Three feed changes are provided through gearing and there is a hand slow and quick movement. The spindle is driven by a worm and worm wheel through gearing, a 3 horsepower motor furnishing motive power. The motor has a speed variation of 3 to 1 which is doubled by slip gears at the top of the column as shown. This gives a speed range to the spindle of 6 to 1. The head of the spindle is counterweighted, the counterweight running inside the column. A vertical adjustment of 3 feet is available for the head. The column has a variable automatic feed of 10 to 1 through friction discs

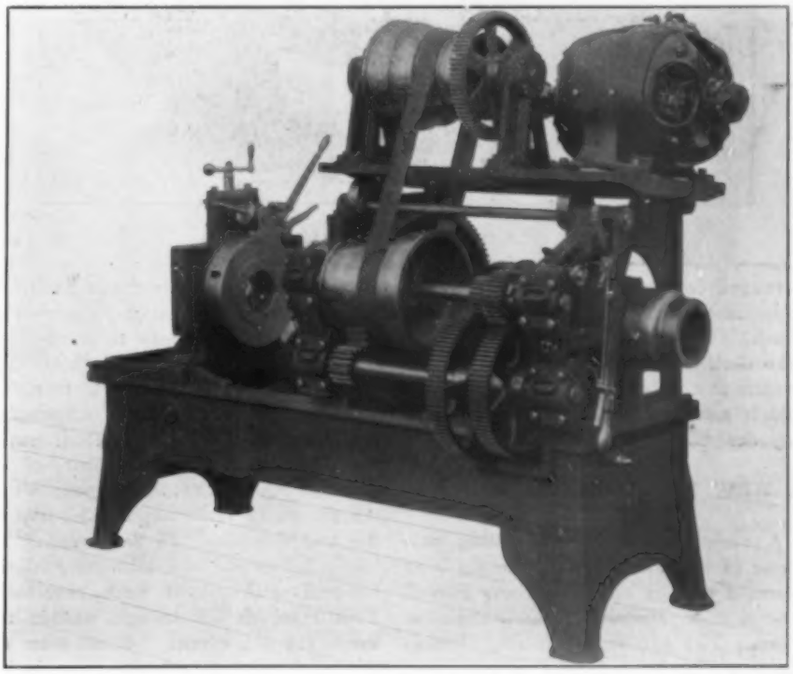


SMALL NEWTON BORING MACHINE.

on the base for milling and hand and power quick movement is also provided for this motion. The dimensions of the work table are 3 feet wide by 6 feet long, the surface being T-slotted as shown. An outboard bearing is provided for the spindle. This machine is being used extensively in place of the knee type of boring machines.

AN IMPROVED CUTTING-OFF AND THREADING MACHINE.

The Bignall & Keeler Mfg. Co., Edwardsville, Pa., has recently placed on the market its No. 4 P. D. Q. C. improved cutting-off and threading machine. This is somewhat similar to a former line of machines of this character which has been sold by this company for a number of years. It is designed for use where a great number of pieces of one size of pipe are to be cut and threaded,



BIGNALL & KEELER CUTTING OFF AND THREADING MACHINE.

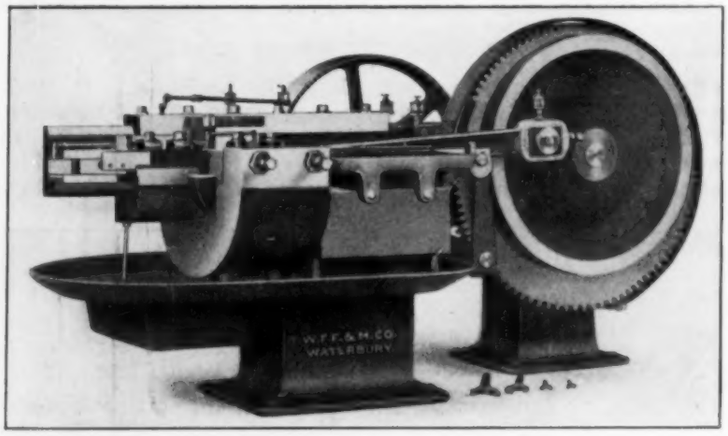
as in tube mills, car shops and supply houses.

The gripping chuck is of the lever type and the various parts are made to withstand severe usage. The chuck arms are solid castings in one piece. They are pivoted on case-hardened pins and are provided with steel rollers in the ends to reduce the friction. The chuck jaws are held in T-slots in the short ends of the levers and are adjusted by means of special case-hardened screws. They are made of tempered steel with teeth of "M" form. They can be readily sharpened without drawing the temper. All gears used on the tool are machine cut.

The speeds available on the machine are eight in number and are obtained through a 4-step cone pulley used in conjunction with back gears.

The capacity of the machine is for pipe from one inch to four inches in diameter. The floor space occupied is twenty-eight inches by seventy-nine inches and the weight is approximately 2,500 pounds.

The illustration shows a machine as arranged for motor drive. The motor is mounted upon a shelf over the headstock, the front end being pivoted. The shelf is raised by means of an eccentric at the back end of the machine which can be elevated so as to get any desired tension on the belt.



HAND FEED TYPE THREAD ROLLING MACHINE

A NEW THREAD ROLLING MACHINE.

A reciprocating thread rolling machine of new pattern has recently been brought out by the Waterbury Farrell Foundry & Machine Co., Waterbury, Conn. The process of rolling threads on screw or wire blanks is rapid and economical, and is used in the manufacture of many articles in preference to cutting the threads from ordinary dies. In this process the blank is worked between dies, whose surfaces are grooved to suit the shape of the thread, and placed at an angle corresponding to the pitch of the screw. No stock is removed in this operation, and the finished product is therefore larger in diameter than the blank by an amount equal to the depth of the thread.

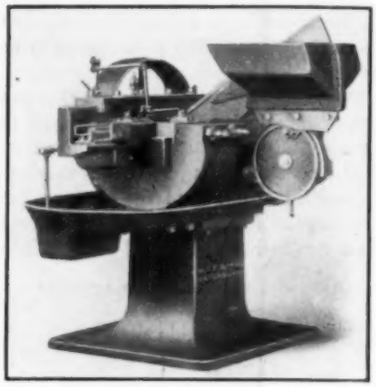
The machine here illustrated has one stationary die and one moving or reciprocating die. Blanks introduced between these dies are worked between their faces, and perfect threads of uniform size are rapidly formed.

The particular point of difference between these machines and those formerly manufactured by this company consist of improved feeding and lubricating devices. The blank to be threaded is placed in position by the operator, or is fed from a hopper, and is automatically caught between two jaws, which hold the blank absolutely rigid and straight, carrying it and introducing it into the dies at the proper moment, thus insuring certain and accurate threads on the longest roll. A positive knockout follows behind the screw, sweeps over the stationary die, and just at the end of the stroke rides over the corner of the moving die, making it impossible for poorly shaped work to stick.

A pan large enough to catch the drip from all parts of the body is furnished on the machines, and in connection with this pan is a geared oil pump, which gives a uniform flow of oil through the adjustable pipes, which are shown in illustration. The moving die and the blank to be threaded are lubricated while the stationary die is covered with oil at each revolution. This removes all foreign matter and keeps the dies clean. The oil after use passes through a tank and filter, and is used continuously with but little oil waste.

The machine is easily adapted to special work, such as, lettering, marking, grouping, knurling on solid cylindrical pieces; also ratchet threads, gimlet points of wood screws, lag screws, hanger bolts, etc.

This machine is built in sizes varying in capacity from wire ⅛ of an inch to 1½ inches in diameter. The number of blanks which can be taken care of per minute in the small machine is about 75; and in the large machine 20. The threads which can be worked vary in length from one inch to 3½ inches in the smallest and largest machine respectively. The speed of the various types of machine range from 250 to 300 revolutions per minute. The floor space occupied by the smallest machine is 45 by 34 inches; and by the largest 173 by 77 inches. The smallest machine weighs about 1,000 pounds, the largest about 18,000. It is built with both hand and automatic feed.



HOPPER FEED TYPE THREAD ROLLING MACHINE.

A NEW HAND DRILL.

The accompanying illustration shows a new hand drill recently brought out by Jas. Clark Jr. & Co., Louisville, Ky. It is an extremely handy tool for use where a great number of small holes are to be drilled in wood or metal. Its capacity is ⅛-inch holes in metal, and 3-16-inch holes in hard wood. If desired, the handle on the end of the machine can be changed to a position opposite the handle on the top.

CLARK HAND DRILL.

It is driven by a motor of 1-10 horsepower, at a speed of approximately, 3,000 revolutions per minute. The motor is wound for either 110 or 220 volts, direct current.

The dimensions of the machine are 12 x 4¾ x 4¾ inches.

SOME NEW CHUCKS.

The Westcott Chuck Co., of Oneida, New York, has recently placed on the market some new chucks, which are stated to be very different from the usual form of that article. These are illustrated in the accompanying engravings. Figs. 1 and 2 show the spur geared scroll combination lathe chuck. Figs. 2 and 3 show the independent lathe chuck.

FIG. 1.—SPUR GEARED CHUCK.

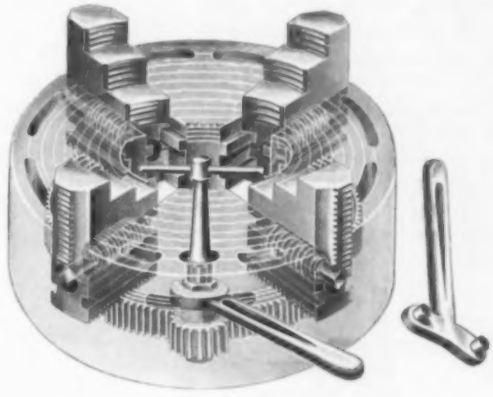


FIG. 2.—SPUR GEARED CHUCK.

In the spur geared chuck, the power applied to produce universal motion of the jaws is transmitted by a spur pinion, which engages with a spur gear cut on the edge of the steel scroll. The pinion is operated by means of an open end wrench which is inserted through an opening in the edge of the chuck as shown, and which engages the hexagonal pinion shaft. If desired, it may also be operated from the face of the chuck, by means of a socket wrench, which fits on the square end of the pinion shaft. These two methods are shown in Fig. 2.

The scroll may be rapidly manipulated by means of a lever engaging directly with it at the back, as in the former type of chuck manufactured by this company. After the jaws have been brought down to the work in this manner, increased gripping power is gained by applying the open end wrench to the pinion. The increased gripping power is not only due to the fact that a spur gear is used, but also to the use of the open end wrench, to which as much power may be applied as is desired, without danger of breakage. The ability to operate the jaws from the edge or face of the chuck, as well as from the rear, is a convenient and noticeable feature. The chuck does not require any shifting in or out of gear, but is always readily operated either independently or universally. It is made in ten sizes, ranging in over all diameter from 8 to 36 inches. These two sizes will hold inside of the jaws pieces 8½ and 43 inches diameter, respectively.

FIG. 3.—INDEPENDENT JAW CHUCK.

FIG. 4.—BACK OF INDEPENDENT JAW CHUCK.

The independent chuck shown in Figs. 3 and 4 is so designed that the end thrust and strain come upon the chuck body at its strongest points. This result has been accomplished by providing each jaw screw with a steel carrier, which is threaded on one side, and fastened by two set screws, one of which follows the other, and each acting as a lock to the other. One-half of each screw engages with the screw carrier, the other half with the body of the chuck. Thus, the thrust is distributed, so as not to spring or break the chuck body. The screw carriers are adjustable. When the chuck is required to hold work larger than its diameter, the set screws may be removed, and the screw carriers driven outward, together with the jaws and the adjusting faces, thereby retaining the full thread bearing between the screw and the jaw, the screw carrier still supporting the jaw. The chuck shown in the illustration is thus adjusted.

The jaws are made of steel and case-hardened. They are reversible, have deep shoulders, and are turned so as to take a firm bite on the work. The chuck body is provided with holes extending completely through the chuck, for convenience in bolting light work, as pulleys, etc. All sizes of this style of chuck are made so that they may be attached to the lathe by means of a face plate, but, they are also threaded, if that mode of attachment is considered more desirable. The chuck is made in 14 sizes, having an outside diameter from 4 9-16 inches to 36 inches, with a capacity ranging from 5½ to 43 inches, respectively. The weight of the smallest and largest sizes is 14 and 650 pounds respectively.

AN ADJUSTABLE MULTIPLE SPINDLE DRILLING MACHINE.

An adjustable multiple spindle drilling machine embodying a number of new features has recently been developed by Wm. Gardam & Sons, 45 Rose street, New York. This machine is illustrated in the accompanying engraving.

The makers desire to call particular attention to the straight belt used, the long length of the head travel, together with the length and width of the head and table bearings on the columns, the steel spindle grooves, convenient arrangement of the operating lever, large base with finished surface directly in front of the column and the self oiling bearings.

GARDAM MULTIPLE SPINDLE DRILLING MACHINE.

The machine is belt driven, is provided with three changes of drilling speed and has three changes of power feed to each change of drilling speed. The head is counterbalanced, and has a vertical motion of 12 inches, by means of a rack and pinion.

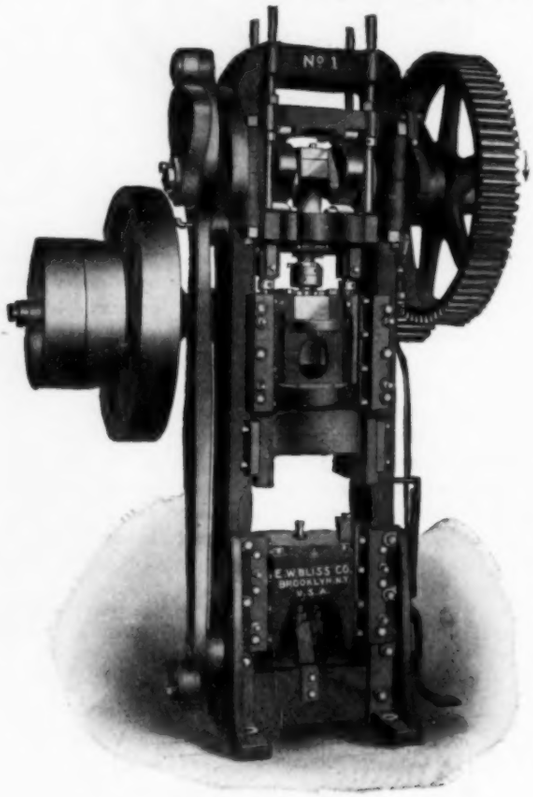
The hand feed is operated by means of a pilot wheel, and the power feed is belt driven. The table is 20 x 24 inches, and is adjustable on the column by a steel screw with a thrust bearing to take the strain. The spindles vary in number as desired from four to twelve, and are made of crucible steel. Each spindle has a vertical adjustment of one inch to compensate for drills of different lengths, and is also fitted with a taper hole to receive either a taper shank drill or a chuck fitted with a taper shank plug.

The adjusting slots in the flange of the head are so arranged as to facilitate an easy setting of the spindle arms. The arms are of such length that any spindle may be used for drilling at the center. The machine is so arranged that one equipped with a small number of spindles can be arranged so that later it can be fitted with the maximum number. It can also be supplied with an enclosed quick change, all gear drive, and all gear feed. Some of the more important dimensions of the tool are as follows:

Number of spindles	4 to 12.
Size of drills according to number of spindles.	
Maximum size of drilling circle or square	15 inches.
Minimum size of drilling circle or square, according to number of spindles.	
Greatest distance from spindles to table in lowest position	24 inches.
Distance from floor to table in lowest position	18¼ inches.
Rise and fall of table	18¾ inches.
Distance from base of column to center of head	13 inches.
Diameter of pilot wheel	24 inches.
Size of base	24 x 60 inches.
Floor space required	33 x 61½ inches.
Height over all	84 inches.

NEW BLISS TRIPLE ACTION DRAWING PRESS.

A new triple action drawing press placed on the market by the E. W. Bliss Co., Brooklyn, N. Y., is the development of the Bliss patent toggle drawing press, which is used for drawing all kinds of sheet metal goods, and is illustrated herewith. This type of press is presented to press users as especially useful and economical for drawing deep, seamless shells. In addition to the plunger, it has two slides, each of which has an independent dwell, thus permitting of making in one operation, work which has hitherto required two operations. This method does away entirely with annealing the first operation shells, inasmuch as the second operation immediately follows the first, making the second draw while the metal is still warm from the first operation. It is interesting to know that a tin shell, 3 inches diameter by 3 inches deep has already been successfully made at one stroke. The press shown will receive a blank 11 inches in diameter and a drawing punch up to 6 inches in diameter. It will draw in depth and lift out up to 3 inches. The total weight of the machine is 8,000 pounds. The press is of very compact construction and occupies no more room than any double-action press of the corresponding size for the second operation shell. It may be set in an inclined position allowing the finished shell to fall off by gravity.

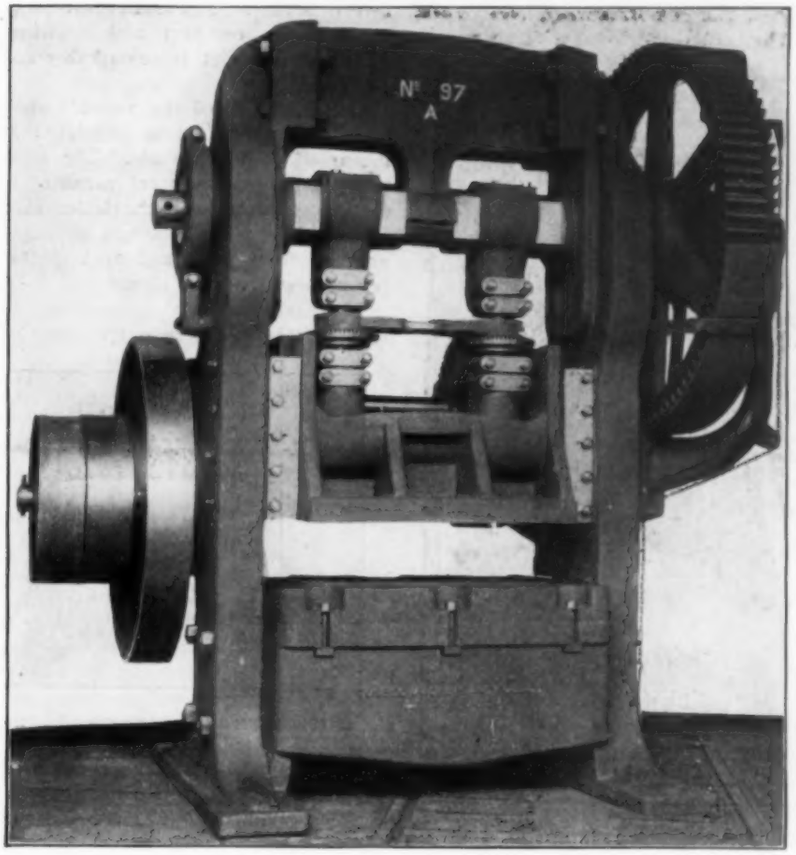


BLISS TRIPLE ACTION PRESS.

A HEAVY TYPE OF DOUBLE PITMAN POWER PRESSES FOR BLANKING.

The Toledo Machine & Tool Co., Toledo, O., has developed a new design of heavy type double pitman power press for blanking. This is shown in the accompanying illustration. It was designed expressly for special blanking and compound perforating and for cutting dies of extra large size for two of the larger electrical manufacturing concerns in this country. The slide bearings are especially suited for this purpose.

The frame is of the four piece pattern, the housing being extremely heavy, especially at the shaft opening. This practically eliminates the liability of fracture at this point through accident or overloaded. The housings are of more than usual depth from front to back, thus giving added rigidity to the bed as well as the arch. The bed rests on a solid shoulder of the housing, and in addition is supported by four heavy bolts on each side, these being reamed fits. The arch bears upward to a solid shoulder on the housing, and is also supported by four bolts on each end.



TOLEDO DOUBLE PITMAN PRESS.

The crank shaft and pitman or connection screws are made of high carbon hammered steel. They are fitted with bevel gears and pinions, which afford a quick and easy positive adjustment. The caps on the upper and lower connections are fitted squarely on the threaded screws, and are held in position by the studs in each cap as shown. The caps themeslves are carefully machined and scraped to a shoulder bearing, thus throwing the strain in heavy work directly on the solid metal of the connection, relieving the studs of all strain. This affords a most effective positive locking device for heavy cutting or embossing. The lower connections are machined and fitted to the solid metal in the slide, the shaft being used only for lifting the slide.

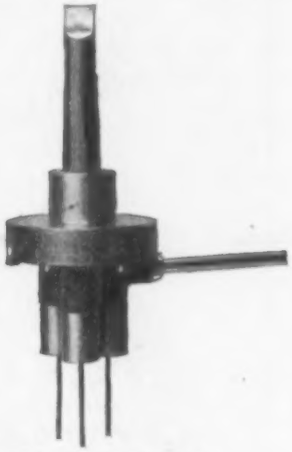
The press is double back-geared, with a ratio of 30 to 1, the gearing being machine cut from the solid. The clutch gear runs loosely on the shaft, just outside the main bearing. The clutch face of both the gear and the clutch collar are fitted with hardened tool steel surfaces. The clutch is of the three engagement automatic block pattern, and is released by means of a weight, throwing the release roll in contact with the cam on a steel collar. This gravity release gives a positive action and eliminates the use of springs for release of the clutch. The outer arm straddles the large gear, and is used only for supporting the gravity releasing adjustment, and not as an outboard bearing for the main shaft. The construction of the pattern is such that various widths between uprights ranging from 60 to 96 inches and more may be obtained at very little expense in pattern construction. The machine is made in 15 sizes.

Some of the dimensions of the tool illustrated are as follows:

Width between uprights 61 inches
Slide area 32 by 48 inches
Bed area 48 by 60 inches
Bed opening 32 by 48 inches
Capacity of press 600 tons pressure
Weight 72,000 pounds.

A NEW MULTIPLE DRILLING ATTACHMENT.

The Francis Reed Co., Worcester, Mass., is offering a multiple drilling attachment shown in the accompanying illustration. The most valuable feature is its facility of application to any drilling machine without special attachments, and to any given spindle. It always drives forward without reversing the direction of spindle rotation.



MULTIPLE DRILLING DEVICE.

The device is made in two styles wholly encased or semi-encased, according to the size and condition of the work. Spur gears are used throughout, the smaller size being driven by internal gears and the larger size by spur gears and idlers.

The illustration represents an attachment wholly encased and made to drill three holes equally spaced upon a 1 7-16 inch circle. It is not necessary however, that they should be on a circle, as the attachment can be made to fulfill any requirement.

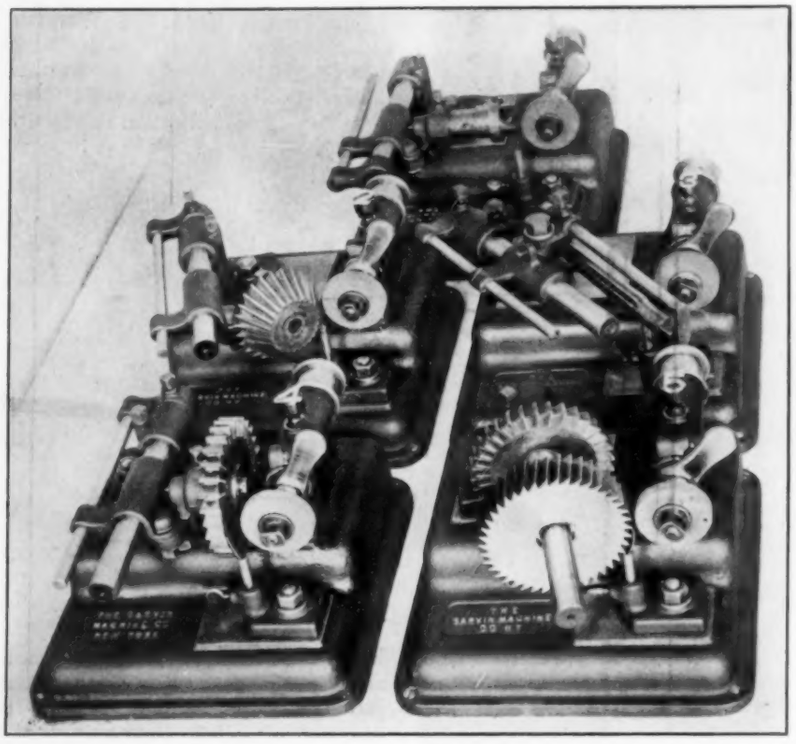
A short light arm is attached to the case to hold the drills in a given position. The tendency toward rotation of the case, however, is very slight, and the arm is put on merely to insure steadiness.

The bearings are all made long and large, and are provided with suitable oil grooves. The gears are of as coarse pitch as is practicable.

The spindles are not adjustable, and the attachment is only built to order upon specifications, thus fitting it perfectly to the class of work for which it is designed.

BENCH CUTTER GRINDER.

In the accompanying illustration is shown a group of No. 1 bench cutter grinders, made by the Garvin Machine Co., of New York. The machine is adapted for grinding various forms of work, as shown in the illustration. It is small and compact, of great flexibility of adjustment, and possesses a large range



GROUP OF GARVIN BENCH CUTTER GRINDERS ADAPTED TO DIFFERENT KINDS OF WORK.

quite sufficient for ordinary machine shop use. It is arranged to be bolted to a bench or mounted on a column, and weighs 65 pounds.

The emery wheel is adjusted to the cut by rocking a small handle just back of the wheel. The spindles and the mandrels, upon which the work is mounted, are hardened and ground. A suitable adjustment is provided, so that the mandrels can be placed in various positions for grinding various types of tools.

Machine No. 1 in the illustration has mounted on it, ready for grinding, a screw machine hollow mill. The mill is held by the body, as it would be under working conditions in a turret. In machine No. 2, an angle cutter 4 inches in diameter is mounted in position for grinding. A taper reamer is in machine No. 3. The reamer is 1½ inches in diameter, by 8 inches long over all, with a flute 5½ inches long. Machine No. 4 is ready to grind a straddle or face mill 5 inches in diameter. The mill is shown in position for grinding on the reverse side. Machine No. 5 is in position for grinding a spiral mill 5 inches in diameter, and 4 inches face.

PNEUMATIC WRENCH.

A wrench to be used in connection with an ordinary air or electric drill to perform the work of screwing up, tightening or unscrewing nuts, has been placed on the market by A. E. Hoermann, 261 Broadway, New York.

The tool is provided with an adjustable friction arrangement, which enables the operator to regulate the tension for the largest nut to be tightened. The nuts are placed on the bolts about 1½ turns, and the tool is then used to run them up to the surface and tighten them. A friction arrangement takes up the jar, and allows the drill to continue rotating, while the wrench-chuck itself remains stationary.

The tool has been thoroughly tested at the shops of the Central railway at Elizabethport, N. J., and the work was found to be remarkably well done. It was found, however, that the ¾-inch nuts were the maximum capacity not of the tool but of the drill, as the largest size drill was not strong enough to develop power to draw a one-inch nut sufficiently tight.

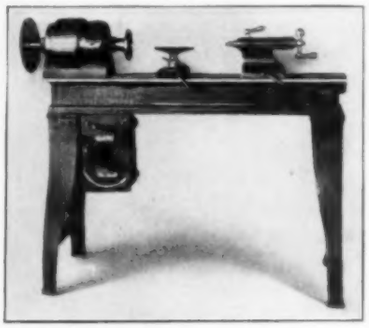
The idea of using an air tool of this type is not altogether new, but the former ones have caused more or less trouble when used with solid chucks, on account of the sudden jar caused at the moment the nut was drawn up on the surface. This jar soon put the drill out of commission.

A MOTOR DRIVEN PATTERNMAKERS' LATHE.

A 10-inch motor driven patternmakers' lathe is the latest production of Fay & Scott, Dexter, Me. The motor is mounted directly on the bed of the lathe, and takes the place of the belt driven head stock generally used, thus producing a compact and handsome tool, and one that is remarkably convenient.

The motor is of the variable speed type, the speed being regulated by means of field variations. The armature and commutator are mounted directly on the spindle, the latter being journaled in taper bearings of bronze with a convenient attachment for taking up wear and end thrust.

The rheostat for controlling the speed of the tool is mounted direct up-



MOTOR DRIVEN PATTERNMAKERS LATHE.

on the bed of the lathe, within an easy reach of the operator. The entire electrical equipment is incorporated into the design of the lathe, so that it is independent of any auxiliary devices, and may be placed in any position whatever.

Some of the dimensions are as follows:

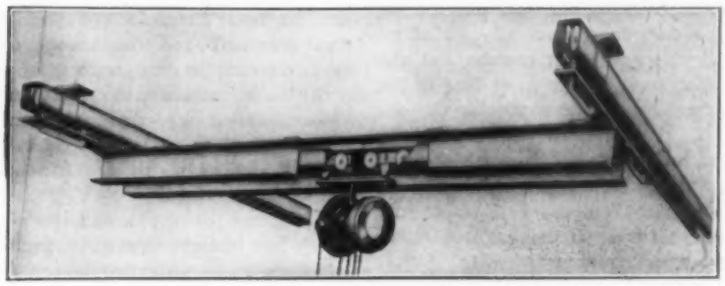
Swings over bed	10 inches.
Swings over rest holder	5½ inches.
Number of motor speeds	12.
Revolutions per minute	800 to 3000.
Horsepower of motor	½.
Voltage	110.
Lengths of bed	4, 6 & 8 feet.
Weight of 4-foot length	450 pounds.

Pure steel is of very low tensile strength. A test of Swedish open-hearth nail rod steel showed a tensile strength of 42,591 pounds per square inch.

A SERVICEABLE TRAVELING CRANE.

For narrow spans and comparatively light loads some form of inexpensive traveling crane has long been desired. The accompanying illustration shows a form which has many advantages and can be used for spans up to 25 feet and loads up to 3,000 or 4,000 pounds.

The crane runway is made of Coburn trolley track, while the crane itself is composed of two channels placed back to back between which is suspended by brackets a section of Coburn track. The trolley hoist operates in this section, and may be either a differential chain block or one of the power hoists operated by electricity or compressed air.



A SERVICEABLE TRAVELING CRANE.

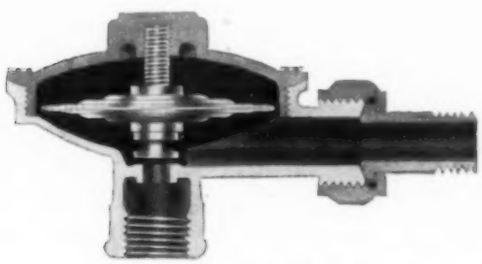
The ends of the crane are attached to supporting trolleys in the runways by pendants in such a way as to distribute the load equally between the 16 supporting wheels.

The trolleys are roller bearing and the parts have been so designed as to give long life and easy operation. These cranes are especially advantageous for side floors, core rooms, cleaning departments and similar locations in foundry construction. The device is manufactured by the New Jersey Foundry & Machine Co., of New York City.

A STEAM HEAT RADIATOR TRAP.

A neat little device for use in connection with steam heating systems of the vacuum type or other systems where a difference of pressure is maintained between the radiator and the return pipes, has been placed on the market, by the C. A. Dunham Co., Marshalltown, Ia. This is shown in the accompanying illustration.

There are no floats or expansion plugs used in its construction. The combined disc and valve are securely anchored in direct line with a flat seat which is ground in and forms a perfect joint with the trap sections. The trap is connected direct to the return end of the radiator, by means of a nipple and ground union. The discharge leads to the main return. The cap is carefully ground in and is made tight without the use of gaskets. To this cap is secured the disc, which is adjusted to meet all conditions, and is permanently set, thus making it practically "fool proof." The trap remains wide open when cold, and as there is no water seal, it cannot freeze. Air and water pass through it rapidly, but steam closes the valve the instant it comes in contact with the disc, holding back the steam until it has been condensed, and then opening it again to permit the escape of the water thus formed.

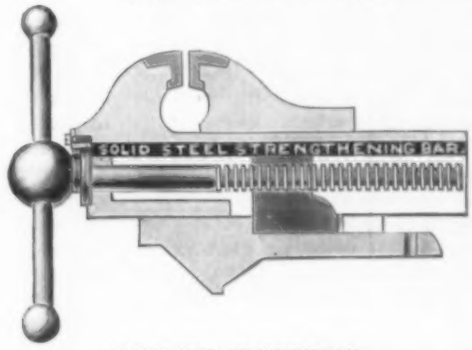


DUNHAM RADIATOR TRAP.

THE PARKER VISE STRENGTHENER.

Charles Parker Co., Meriden, Conn., has recently had patented a device for strengthening vises. The claim made for the vise strengthener is that it makes a vise practically non-breakable in the slide. This gives a much longer life to the vise.

The construction is clearly shown in the accompanying illustration. The strengthening device consists of a steel bar, inserted in the slide above the screw. This extends from one end of the slide to the other, as shown. The vise itself is made of semi-steel. The entire arrangement is extremly rigid and durable.



PARKER VISE STRENGTHENER.

TIPS FROM THE CONSULS.

In a recent speech before the Australian parliament Governor General Lord Northcote stated that a bill prepared "to secure the interests of Australian producers and consumers against the unfair encroachments of foreign or domestic commercial trusts." This bill is said to be aimed against the shipment to and sale in Australia of American-made machinery and implements, particularly in the harvesting line.

Consul Fleming, of Edinburgh, in reply to inquiries from American manufacturers of fireproof safes, writes as follows: "Good American safes should have a large sale in this country, as the safes one sees in Scotland are principally of antiquated designs and are rather crude in construction and poorly finished. Each of the three or four leading British safe manufacturers has a sale room in this city in charge of a special representative. The best method of selling American safes in the Edinburgh district, short of opening a regular agency, would be through one or more of the large iron-mongery establishments."

The proposed Argentine duty on repair parts of agricultural machinery has been amended, writes Minister Beaupre, by the adoption of the substitute approved by the agents of American manufacturers.

The Colorado Fuel & Iron Co. is about to begin the construction of a number of improvements. The soaking pit capacity at the rail mill will be doubled and necessary buildings and gas producers will be added. There will be a complete, modern plant for the preparation of refractory material. In the open-hearth department will be installed six additional furnaces of 50 tons capacity each.

BOOK REVIEWS.

Eminent Engineers by Dwight Goddard, New York, The Derry-Collard Co. 5¾ inches x 8 inches.—280 pages. Cloth. Supplied by THE IRON TRADE REVIEW for $1.50

Every engineer is frequently asked something of the life history of some of the men that have made engineering famous, and few have at their tongue's end the history of these different men. On this account every engineer should have at hand some work from which he can obtain information concerning the life and work of those who have done so much for engineering. Mr. Goddard has made a special study of this subject for a great many years, and gathered together a rare collection of biographies and portraits, which he has finally collected into the little book under consideration.

The volume contains the biographies of sixteen European and sixteen American engineers. These are not the ordinary dry history of a man's life, but are written in an interesting style, so that it is a pleasure to read the book.

Mineral Industry for 1904. Published by the *Engineering and Mining Journal.* New York City. 6 inches x 9 inches. 560 pages. Cloth. Supplied by by THE IRON TRADE REVIEW for $5.00.

The late Robert P. Rothwell commenced the gathering of the statistics of the mineral industry, and published them annually. The volume under consideration is the thirteenth annual report, and was prepared by the editorial staff of the *Engineering and Mining Journal* under the direct supervision of Edward K. Judd.

As in all of the previous editions, the output of each of the principal products of the country, is treated statistically and comparisons made between the present and past production.

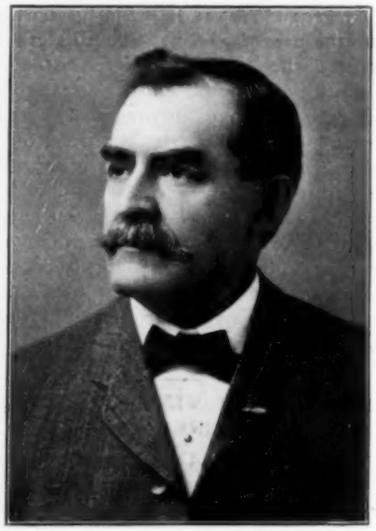
One feature of the book has always been the especially contributed articles published upon advances in different departments of metallurgy and the science of refining the metals and minerals. The present volume contains considerable material of value along this line, and should take its place on the library shelves of all engineers interested in this work.

The statistics in the book are for 1904, and the greatest objection to the work is that the statistics come out a year old, but nevertheless it is of great value to be able to obtain them in the accurate form in which they are presented in the volume under consideration.

One feature of the book is the bibliography of each of the principal subjects, which is published at the end of the chapters, and serves to keep any student in touch with the entire literature of the subject in which he is interested.

A SUCCESSFUL CONVENTION.

Only progress and success were to be reported at the first annual convention of the National Supply and Machinery Dealers' Association which was held at Fortress Monroe, Feb. 15, 16, and 17. Although nominally one year old, the association had done practically all of its work in the past eight months and the accomplishments of that brief time in the various reforms which comprise the objects of the organization were little short of remarkable. The excellent work of the official board originally selected was recognized in the re-election, the only change being in the office of secretary-treasurer from which Mr. J. H. Drury resigned to take up his duties in connection with the Union Twist Drill Co. of Athol, Mass., in which he is interested. Both he and W. M. Pattison who served as secretary-treasurer during



A. T. ANDERSON.

the first few months of the association's life were presented with handsome silver loving cups. Mr. Drury's successor is A. T. Anderson, formerly a manufacturer of Cleveland, then county recorder, postmaster of Cleveland and recently commissioner of the National Board of Trade. Both the address of President E. E. Strong, of the Strong, Carlisle & Hammond Co., Cleveland, and of Mr. Drury reviewed the work of the year and what has been accomplished in carrying out the expressed aim of the organization, to promote harmony among dealers and manufacturers. The "resale" price was discussed at length and the association went on record as urging its adoption by manufacturers, "whose disposition to co-operate" was heartily endorsed and to whom the support of the association in encouraging and establishing this policy was pledged. The proposed parcels post system was vigorously opposed on the grounds that it would create a large postal deficit, while the adoption of a one-cent rate for first class mail matter was urged in view of the fact that the rate is now several times the actual cost of the service rendered. A standard size for trade literature and price books was discussed and the abuses of the cash discount system were gone over.

Both in attendance and interest the convention was thoroughly successful. A number of manufacturers were present and addressed the members at the open session.

A feature of the association's work which has brought gratifying results and which is to be extended is the formation of local organizations. Philadelphia dealers were brought together by officers of the association on their way north from the convention, and the system will be introduced in other centers.

FREIGHT RATES FROM SOUTH.

In view of the advance in freight rates from Alabama furnaces to northern points, which becomes effective March 1, the following tariff charges per ton for iron shipments from Birmingham to Cincinnati, as compiled by Rogers, Brown & Co., are of interest: Jan. 1, 1893, $2.75; April 2, 1894, $2.25; Sept. 16, 1895, $2.75; May 1, 1897, $2.25; Feb. 6, 1899, $2.75; June 21, 1899, $3.25; Oct. 1, 1900, $2.75; Sept. 15, 1902, $3.25; Feb. 1, 1903, $3.25; Oct. 10, 1903, $2.75; March 1, 1906, $3.00.

C. E. Sontum, Canadian commercial agent for Sweden and Norway, reports that two important inventions in connection with the iron and steel industry are attracting much attention in Sweden. The inventors are two Swedish engineers Messrs. Grondil and Kjellin. Grondil's system of producing iron from the ore is to crush the ore to fine dust and draw out the iron by strong magnets. It is then molded into the form of bricks. Kjellin employs electricity for extracting the iron. Contracts for the production of iron and steel under the Grondil method have been made with the Krupp Works at Essen, Germany, and other firms, and Kjellin's system will be employed by French, German and Italian firms in the production of from two to three million tons of iron and steel per year.

Nine steel hulls are under course of construction at the marine department of the Maryland Steel Co., Sparrows Point.

Dull Week on the Stock Exchanges.

Moderate dealings in the most quiet market which has prevailed for a long period brought small advances in the quotations of a number of iron and steel securities duirng the past week. In no case, however, were the changes considerable and stocks generally remained on the same level. Trading was exceedingly dull, the total transactions of Friday being the smallest of the year for a full session of the New York Exchange while in the two hours' session of Saturday only 286,000 shares changed hands. Mining securities and the Pacific issues were the object of chief interest, though Reading sold 672,400 shares. United States Steel common sold more than 400,000 shares and preferred over 100,000, both recording slight advances. Colorado Fuel & Iron was also the basis of comparatively heavy trading and reached a slightly higher level. Other than this iron, steel and manufacturing stocks shared in the general dullness. The report of the Pressed Steel Car Co., while thoroughly favorable, did not succeed in keeping its securities from sagging. In this case, as in many similar cases recently, the good news had evidently been discounted in advance to a greater extent than the formal announcement showed was warranted. The absence of any definite developments on which to base a forecast of the mining situation acted as a deterrent influence to heavy dealing. It is known that, while a number of large industrial corporations have been able to lay up coal in good supply, this had been impossible in the majority of cases and the effect of a general strike would speedily affect the iron and steel industry to a certain extent in this way. The new York money market during the week continually manifested a hardening tendency and the evident intention of congress to make the railway investigation a searching one also had a decided effect in keeping the transactions in stocks at a low figure.

FINANCIAL NOTES.

The Alabama Steel & Wire Co. has called for redemption May 1 at 105 and interest its entire issue of $750,000 six per cent bonds of 1923.

The Columbus Wire & Iron Works has declared a dividend of seven per cent; the Pittsburg Valve, Fdy. & Construction Co. paid a one per cent dividend Feb. 1 and will pay another of the same amount May 1; the Barney & Smith Car Co. has declared the regular quarterly dividend of 2 per cent on preferred stock, payable March 11.

The subscription privilege for the new stock of the Tennessee Coal & Iron Co. expires April 16. Stockholders of record March 1 may subscribe for any amount equal to 15 per cent of the stock they hold.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Feb. 17	Closing Quotation Feb. 24	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Dec.
Allis-Chalmers Co	22⅝	21⅞	− ⅜	Sept.	100	19,820,000	7 cum	.....	.....
Allis-Chalmers preferred	62	59¾	−2¼		100	16,150,000		.....	Feb., 1904
AmericanCan	10	9⅞	− ⅛	Apr. 24	100	41,233,300	7 cum	.....	.....
AmericanCan preferred	69	68	−1		100	41,233,300		5 Q.	Jan., 1906
AmericanCar and Foundry	42⅞	43⅛	+ ¼	June 28	100	30,000,000	7 n. c.	.....	May, 1905
AmericanCar and Foundry preferred	102	101⅛	− ⅞		100	30,000,000		7 Q.	Jan., 1906
AmericanLocomotive	71⅞	73	+1⅛	Oct. 16	100	25,000,000	7 cum	.....	.....
AmericanLocomotive preferred	116	116⅛	+ ⅛		100	24,100,000	4	7 Q.	Jan., 1906
American Shipbuilding	57⅞	55	−2⅞	Oct. 2	100	7,600,000	7 n. c.	4 Q.	Dec., 1905
American Shipbuilding preferred	107	107	.....		100	7,900,000		7 Q.	Jan., 1906
American Steel Foundries	11⅝	12	+ ⅜	Oct. 3	100	17,700,000	6 cum	.....	.....
American Steel Foundries preferred	47¾	47¾	+ ⅜		100	17,700,000		.....	Aug., 1905
Barney & Smith	25	25	.....	June 5	100	1,000,000	8 cum	.....	June, 1894
Barney & Smith preferred	125	125	.....		100	2,500,000		8 Q.	Mch., 1906
Bethlehem Steel	31	31	.....	April 3	100	15,000,000	7 n. c.	.....	.....
Bethlehem Steel preferred	90	91	+1		100	15,000,000	6	7 Q.	Feb., 1906
Bullock Electric preferred	114	114	.....	Oct. 2	100	1,000,000	6	6 Q.	Jan., 1906
Cambria Steel	35¼	35⅝	.....	March 20	50	45,000,000	4	3 S. A.	Feb., 1906
Cambria Iron	49½	48½	−1		50	8,468,000	7	4 S. A.	Jan., 1906
Colorado Fuel & Iron	62¼	63⅝	+1⅜	Oct. 15	100	30,132,000	5	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	24	24	.....	May 31	100	6,098,000		.....	Nov., 1902
Crucible Steel	15⅝	15⅜	− ¼	Oct. 17	100	25,000,000	7 cum	.....	.....
Crucible Steel preferred	77½	78	+ ⅜		100	25,000,000		.....	Sept. 1903
Empire Steel	7⅛	7⅛	.....	Feb. 28	100	2,281,400	6 cum	.....	*
Empire Steel preferred	37	37	.....		100	2,500,000	5	3 S. A.	Jan., 1905
Fay & Egan	95	95	.....	Feb. 20	100	1,000,000	7 cum	5 Q.	Nov., 1905
Fay & Egan preferred	120	120	.....		100	1,000,000	8	7 Q.	Nov., 1905
General Electric	170	170½	+ ½	May 8	100	48,256,050		8 Q.	Jan., 1906
International Pump	34	33	−1	June 5	100	12,262,500	6 cum	2	July, 1905
International Pump preferred	80	82	+2		100	8,850,000		6 Q.	Feb., 1906
Lackawanna Steel	80	75	−5	March 14	100	34,971,400		.....	
Lake Superior Corporation	20	20	.....	Oct. 3	100	40,000,000	6	.....	
Niles-Bement-Pond	119	119	.....	Feb. 7	100	5,000,000	6 cum	6 Q.	Feb., 1906
Niles-Bement-Pond preferred	106	106	.....		100	2,000,000		6 Q.	Mch., 1906
Otis Elevator Co	57	60	+3	March 19	100	6,350,300	6 n. c.	2 A.	Apr., 1905
Otis Elevator Co. preferred	104	103	−1		100	5,589,500		6 Q.	Jan., 1906
Pittsburg Coal Co	15½	15½	.....	Feb. 12	100	30,135,000	7	.....	
Pittsburg Coal preferred	55½	55	− ½		100	30,716,200		.....	Apr., 1905
Pressed Steel Car	58⅜	56¼	−2⅛	Feb. 21	100	12,500,000	7 n. c.	3	Aug., 1904
Pressed Steel Car preferred	100¼	99	−1¼		100	12,500,000		7 Q.	Feb., 1906
Pullman Palace Car	238	239	+1	Oct. 18	100	74,000,000		8 Q.	Feb., 1906
Railway Steel Spring	56	56¾	+ ⅜	March 1	100	13,500,000	7 cum	4 S. A.	Oct., 1905
Railway Steel Spring preferred	104⅛	105	+ ⅝		100	13,500,000		7 Q.	Dec., 1905
Republic Iron & Steel	32	31⅞	− ⅛	Oct. 17	100	27,352,000	7 cum	.....	
Republic Iron & Steel preferred	105	105	.....		100	20,852,000	5	7 Q.	Apr., 1906
Sloss-Sheffield	84	83¾	− ¼	March 14	100	7,500,000	7 n. c.	5	Jan., 1906
Sloss Sheffield preferred	108	108	.....		100	6,700,000		7 Q.	Jan., 1906
Tennessee Coal & Iron	152	156	+4	May 15	100	22,552,800		4 Q.	Jan., 1906
U. S. Cast Iron Pipe & Foundry	45½	48	+2½	June 27	100	12,500,000	7 n. c.	2	Jan., 1906
U. S. Cast Iron Pipe & Foundry preferred	93	92½	− ½		100	12,500,000		7	Feb., 1906
U. S. Steel	41¼	42⅛	+ ⅞	April 16	100	508,302,500	7 cum	.....	Dec., 1903
U. S. Steel preferred	106⅜	107	+ ⅝		100	360,281,100	5	7 Q.	Feb., 1906
U. S. Steel 5's	99	99	.....		100	463,798,000		5 A.	
Virginia Iron, Coal & Coke	46	49½	+3½	Sept. 18	100	8,641,600	10	.....	
Westinghouse Electric	161	161	.....	June 27	50	20,996,350	20	10 Q.	Jan., 1906
Westinghouse Air Brake	156	155½	− ½	Oct. 2	50	10,990,450		20 Q.	Jan., 1906

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The American Concrete Machinery Co., Columbus, O., has been incorporated with a capital stock of $100,000, and an extensive plant will be erected in the near future. Robert C. Kyle is president, the other incorporators being J. W. McPherson, R. V. Cunningham, W. L. Dugan and R. S. Scott.

The Hilliard Clutch & Machine Co., capital $150,000, has been organized at Elmira, N. Y., by John M. Connelly and others for the manufacture of an automatic shaft clutch, the invention of W. J. Hilliard.

The Cincinnati Lathe & Tool Co., capital $25,000, has been incorporated by W. C. Heindel, who has been connected with the Cincinnati Milling Machine Co., and a number of others. The lathe department of the Fosdick Machine Co. has been acquired and a building on Spring Grove avenue is well under way.

Wm. B. Harvey, E. H. Goodman, W. F. Martin and Wm. Carr constitute the Standard Foundry Co., recently organized at Chester, Pa., to operate the works formerly owned by the Delaware River Steel Castings Co.

The Central Machine Works, Keystone, W. Va., has been incorporated for $15,000 by B. P., T. L. and W. H. Henritze and associates.

The Columbia Machine Co., Zanesville, O., has been incorporated with a capital stock of $10,000. The officers are as follows: William Haehnlein, president and manager; Frederick Feasley, vice president; William H. Haehnlein, secretary and treasurer.

The Caldwell Mining Car & Foundry Co., Caldwell, O., has been incorporated with a capital stock of $20,000. The incorporators are: J. J. Jones, J. J. Schuler, C. J. Hodge, David Friedman, David Quick and H. L. Hastings.

The Boston Machine Works Co., Boston Mass., has been incorporated with a capital stock of $100,000 to manufacture machines. The officers are as follows: C. E. Riley, president; D. A. Carrick, treasurer; T. O. Nicholson, clerk, all of 65 Franklin street, Boston, Mass.

The Niagara Handle & Ferrule Co., Buffalo, N. Y., has been incorporated with a capital stock of $30,000 to manufacture tools and hardware. The incorporators are: Albert Southall, Gustavus A. Kinkel and Alexander Pattenden.

The Michigan Brass & Copper Co., Detroit, has been organized with a capital stock of $800,000. Geo. H. Barbour at the head of the Michigan Stove Co., is president; F. T. Moran, vice president; and M. D. Carpenter, temporary treasurer. Other directors are: James E. Danaher, H. B. Ledyard, M. J. Murphy, F. M. Alger, Jeremiah Howe and D. M. Ireland. Temporary headquarters have been secured in the Union Trust Co. building, and the construction of an extensive plant has already been begun. Hugh L. Thompson, of Waterbury, Conn., is consulting engineer of the plant and will have entire charge of the installation of machinery.

The Blount Mountain Coal & Iron Co., Gadsden, Ala., has been incorporated with a capitalization of $100,000 to mine coal and iron. The incorporators are: T. M. Williams, of Birmingham; W. F. Roberts and a number of others of Altoona, Ala.

The Trimount Rotary Power Co., New York, has been chartered to manufacture pumps and pumping machinery. The capital stock is $10,000 and the incorporators are: Charles L. Eidlitz, No. 341 West Seventy-first street; William C. Schickel, No. 5 West 125th street and Albert Palmer, No. 68 William street, all of New York.

The W. J. Duane Co., New York, has been incorporated with a capital stock of $5,000 to manufacture motors, engines, etc. The incorporators are: W. J. Duane, No. 243 East Eighty-second street; Frederick A. Phillips, No. 174 West Ninety-third street; Alexander Young Pringle, No. 163 West Fifty-seventh street, all of New York.

The Taylor-Herrick Rotary Engine Co., New York, has been chartered with a capital stock of $30,000 to manufacture iron, steel and asbestos. The incorporators are: Gerard P. Herrick, No. 7 Wall street; Irving E. Raymond, No. 879 Broadway, both of New York, and Edwin Taylor, No. 587 Eastern Parkway, Brooklyn.

The Manle Drive Co., No. 15 Exchange Place, Jersey City, N. J., has been incorporated with a capital stock of $200,000 to manufacture variable speed gears and machinery connected therewith. The incorporators are: Albert P. Overman, No. 391 West End avenue, New York, Thomas M. Rowlette and Frederick I. Lockman, No. 35 Nassau street, New York.

The New York Motor Trunk Co., New York, incorporated with a capital stock of $75,000, will manufacture motors, engines, machines, etc. The incorporators are: John I. Traphagen, Suffren, N. Y.; William Conover, No. 592 West 151st street; Edward P. Fallows, No. 219 West Seventy-ninth street, both of New York and two others.

The Turbo-Electric Construction Co., New York, has been incorporated with a capital stock of $75,000 to construct electrical plants, etc. The incorporators are. George F. Archer and Gustav E. Hesse, of No. 39 Cortlandt street, New York, and William D. Vanderbilt, No. 39 Monroe Place, Brooklyn.

The George J. Scott Motor Co., N. Y., has been incorporated with a capital stock of $25,000 to manufacture gas heat and steam apparatus. The incorporators are: George Scott and Madeline Scott, Westwood, N. J., and Jacob Michaels, No. 375 Central Park West, New York.

The J. M. King Co., Waterford, N. Y., chartered with a capital stock of $40,000, will manufacture machinery, etc. The incorporators are: Thomas Breslin, Charles L. Mitchell, Waterford, N. Y.; Chauncey J. Hamlin, Buffalo, N. Y.

The American Gasoline Motor Co., Baldwinsville, N. Y., has been incorporated with a capital stock of $20,000 to manufacture gasoline motors, boats, etc. The incorporators are: D. Sweet, Howard Hendrickson, William A. Hendrickson, James E. Carthart, William B. Harris, all of Albany, New York.

The Marx Winkler Co., Nos. 743-745 Washington street, Newark, N. J., has been chartered with a capital stock of $50,000 to manufacture machinery. The incorporators are: Fred Marx, Carl Winkler and Carl Hiltner, all of Newark, N. J.

The Montclair Auto Station Co., No. 657 Bloomfield avenue, Montclair, N. J., will manufacture engines, motors, machinery, etc. The capital stock is $50,000 and the incorporators are: John W. Surbrug, Hawthorne Place, Montclair; William H. Benjamin and Roy Jenkins, No. 65 Bloomington avenue, Montclair, N. J.

New Construction:—

The Seneca Chain Co., Kent, O., has decided to erect an additional 40 x 140 feet to the west end of the main building of the plant. This will provide room for forty additional fires.

The Sims-Kent Co., recently incorporated at Dover, N. J., to conduct a steel foundry business, will at once begin the erection of a plant. The foundry proper will be one story of steel construction, 60 x 160 feet. There will also be an office building, machine shop, pattern shop, storage, engine and boiler shops. M. Sims is president, J. W. Kent, secretary and treasurer and J. B. Lydecker, sales manager.

The Owosso Mfg. Co., Perla, Ark., states that it will probably not begin the erection of a new factory building to replace the one recently destroyed by fire before May 1. As all the machinery of the power plant was destroyed, the

company will be in the market for new equipment throughout. L. Flickinger is secretary and treasurer.

The John Bouchard & Sons' Co., Nashville, Tenn., with a specialty of the manufacture of heavy machinery, has work well under way for an addition to its present plant which practically doubles its capacity. The company expects to install considerable machinery.

The Kellogg Iron Works, Buffalo, N. Y., in order to accommodate its structural iron and steel business, is putting up what is termed a "stock plant" about one mile beyond the city limits on the B. R. & P. railway. This will be equipped with traveling cranes, skids, beam shears and tools for punching and cutting the various sizes of steel. The plan is to order bars from 60 to 70 feet long from the mills and cut them into the lengths required in the structural shop which will be retained.

J. A. Moore, general manager of the Moore Investment Co., Seattle, Wash., states that a site for the blast furnace and steel plant in which he is interested has been secured and that within sixty days contracts will be let for the erection of a 300-ton blast furnace. Further than this, plans for the further construction of the plant are not disclosed.

The Wallace Machine & Foundry Co., Lafayette, Ind., is soon to construct a steel erecting shop 44 x 90 feet. Necessary equipment has been ordered.

The plant which is being erected at Pullman, Ill., for the Griffin Wheel Co., consists of a large and modern car wheel foundry with an electric power plant and all necessary adjuncts. The site is about thirty acres in extent and is located on the tracks of the Pullman railway. It is expected that the plant can be placed in operation in the near future with a capacity of 500 wheels per day. The Griffin Wheel Co. has two other foundries in Chicago and six in other sections of the country.

The Vulcan Iron Works, Seattle, Wash., has sold its site in that city and will shortly begin the erection of a new plant, though a definite location has not yet been selected.

The Pratt & Whitney Co., Hartford, Conn., has completed plans for its new machine shop which will be 180 x 256 feet, five stories in height with steel frame. The second floor will be used for office purposes and the remainder of the building will be used as a machine shop. Work is now progressing on the new foundry which will be 116 x 210 feet, with a second story 32 x 210 feet.

The National Radiator Co., Johnstown, Pa., has increased its capital stock from $100,000 to $350,000, and has closed a deal with the Lorain Steel Co. for the purchase of one and one-half acres of additional land on which extensions and improvements to the present plant at a cost of between $75,000 and $100,000 are planned. Among the improvements will be an extension to the foundry which will double the capacity and a new warehouse several times the size of that now in use. Samuel B. Waters is president and John H. Waters, secretary and treasurer.

The Commonwealth Steel Co., Granite City, Ill., is to increase its plant at once by the erection of a steel building 78 x 125 feet. The contract has been let to the Joliet Bridge & Iron Co., Joliet, Ill.

The American Wood-Working Machinery Co., Aurora, Ill., is planning a large addition to its foundry building. The company is just now completing a building of similar size.

The National Iron Works, Spokane, Wash., is planning the erection within the near future of an extensive iron and steel plant. The company owns an extensive site in Spokane, but difficulty in securing a right of way for switch connections has interfered with the completion of definite plans. J. H. Boyd is general manager of the company.

The partly completed furnace which the Chattanooga Blast Furnace Co. recently purchased will be completed before the end of March. It will be equipped with the Brown Hoisting Machinery Co.'s top filling device. Extensive coal and ore properties have been acquired and will be amply sufficient for the company's needs. C. E. Buck is president.

The Sibley Machine & Tool Co., South Bend, Ind., manufacturing machinery with a specialty of machine drills, has begun work on extensive additions to its foundry.

The Columbia Tool Steel Co., Chicago Heights, Ill., is requesting propositions to cover the construction of an additional 30-pot crucible furnace with gas producers, which will double the present capacity of the company. E. T. Clarage is president.

The Krom Machine Works, 170 Broadway, New York, is preparing plans for a machine shop to be added to its plant at Plainfield, N. J. The structure will be 100 x 200 feet.

The Frick Co., Waynesboro, Pa., manufacturing machinery, is to erect a new boiler shop, 100 x 250 feet, and will add the present boiler shop to the machine shop as an annex. Considerable new machinery is being installed.

The Alabama Consolidated Coal & Iron Co.'s financial statement for the year closed Oct. 31, 1905, contains a list of the improvements undertaken during the year. The most important of these undertakings is the construction of a new and modern blast furnace at Gadsden and 150 additional coke ovens. When completed the company will have a total of 915 ovens and four furnaces with a capacity of 200,000 tons per annum.

The new structure which the American Ship Building Co. is to add to its plant at Lorain, O., will be 220 x 245 feet and of steel construction. The American Bridge Co. has been awarded the contract for the structural work. The American Machinery & Mfg. Co., Cleveland, will furnish for the Lorain plant two seven-ton cranes with a span of 58 feet, 6¼ inches and four seven-ton cranes with a span of 48 feet, 6¼ inches.

The building plans of the Standard Sanitary Mfg. Co., Louisville, Ky., which are now being carried out, provide for a four-story structure 80 x 135 feet of which the first floor will be devoted to office purposes, the second will be used for an extension of the brass finishing department and the third and fourth floors for storage and shipping purposes. The building will cost approximately $50,000. A new brass foundry building is also being erected as the present brass foundry must make room for the other structure.

General Industrial Notes:—

The Canton Boiler & Engineering Co., recently organized at Canton, O., has a paid up capitalization of $18,000 which will probably be increased at an early date. The officers are: President, Lee A. Housley; vice president, Percy A. Housley; secretary, treasurer and general manager, Allison D. Housley; engineer, Elmer E. Miller, and superintendent, J. S. Kiddey. The company was organized to take over the plants and business of the Canton Boiler Works and the Kiddey Boiler & Engineering Works, which will be combined to re-equip the plant of the Canton Boiler Works and enlarge its capacity. Boilers, feed water heaters and purifiers, steel stacks, storage tanks, etc., will be manufactured and the company will also act as contracting engineer and pipe fitter.

Curtiss, Randall & Co., recently incorporated at Champaign, Ill., will manufacture a full line of couplings, hangers, pillow blocks, etc., will furnish iron work and conduct a general jobbing business.

The Pacific Iron Works Co., one of the oldest manufacturing concerns of Bridgeport, Conn., has been acquired by a new company which retains the name. William E. Burnham is president, Preston H. Skidmore is secretary and treasurer and the following are additional directors: Henry A. Bishop, F. J. Kingsbury, F. A. Parkhurst. The company was for many years managed by the late Philo H. Skidmore Jr.

The Cummings Machine Co., 34 Pine street, New York, recently incorporated, will manufacture a novel line of threading tools designed to forge stand-

ard pipe threads on tubes the walls of which are too thin to admit of the cutting of threads. George W. Phillips is president and treasurer and W. C. Heinkel, secretary.

The Elwood Iron Works, Elwood, Ind., has changed hands, the officers of the purchasing company being as follows: president, John H. Terhune, of Anderson, Ind.; vice president, John J. Moron, of Chicago; secretary, Isaac E. May, and treasurer, W. N. Durbin, both of Anderson. It is stated that a number of improvements will be made.

The Reading Iron Co., Reading, Pa., has purchased the old rolling mill property from the McIlvain estate, and for the present will use the site for storage purposes.

The extent to which the automobile manufacturing industry has spread is evidenced by the fact that a canvass of manufacturers made in connection with the automobile show at Cleveland during the past week showed that more than 5,500 cars will be turned out in Cleveland factories during the present season, their value being in excess of $15,000,000.

The Catoctin furnace property, including the furnace at Catoctin, Md., and about 10,000 acres of land, recently operated by the Blue Mountain Iron & Steel Co., Baltimore, has been purchased at bankruptcy sale by Joseph B. Thropp, of Everett, Pa., who will develop the iron mines. Mr. Thropp owns the Everett furnace. The consideration was $51,000.

Phelps, Dodge & Co., New York, will hereafter devote their attention principally to their copper and railroad business, and will abandon the selling of all metals except ingot copper.

Glenwood Furnace of the Logan Iron & Steel Co., Glenwood Furnace, Pa., is to be dismantled after almost three-quarters of a century of operation. Its properties, which include some 30,000 acres of land, have been sold to the state of Pennsylvania and will become a part of its forest reserve.

The John Deere Plow Co., St. Louis, Mo. which was recently incorporated, merely takes over the business which has been run for several years as a co-partnership.

The American Cableway Co., Fall River, Mass., will make a specialty of manufacturing conveying and hoisting machinery.

The furnace of the LaFollette Coal, Iron & Railroad Co., at LaFollette, Tenn., which has been idle for relining and a general overhauling during the past two months, is again in blast.

The Sycamore Foundry Co., Sycamore, Ill., has leased the entire plant of the Frank C. Patten Co. of that city.

The Norton Iron Works, Ashland, Ky., expects to blow in its plant about the middle of March. Two new blowing engines have been installed, three new stoves built and the plant has been generally overhauled.

Fires:—

The old plant of the Diamond Iron Works Co., Minneapolis, was reduced to a heap of ashes Feb. 17 when fire broke out in what was formerly the boiler room. The loss was only about $5,000 as the machinery had been removed to a new building. The plant had been on fire more than twenty-five times in the past eighteen months.

The Bird Iron Co. lost the store building at its plant at Lawrence, near Ironton, O., by fire Feb. 17. The loss was about $5,000.

The machine and bucket shops of the Niedringhaus Rolling Mill Co., St. Louis, Mo., were destroyed by fire Feb. 18, the loss being in the neighborhood of $50,000.

The foundry of A. H. Smith at No. 2127-2129 Race street, Philadelphia, Pa., suffered a fire loss of $1,500 on Feb. 12.

The E. D. Jones Sons machine shops in Mackay street, Pittsfield, Mass., was damaged by fire to the extent of about $1,000 on Feb. 7.

Fire at the Richmond branch of the American Locomotive Co., Richmond, Va., Feb. 16, caused a damage estimated at $25,000. The blaze started in the office adjoining the pattern shop, but did not spread to other portions of the plant, and work in the shops, with the exception of the pattern shop, was not delayed.

The hill plant of the J. Stevens Arms & Tool Co., Springfield, Mass., sustained a considerable loss Feb. 14, as a result of a subborn fire which originated in the dry kilns.

The coach shop of the Colorado & Southern Railroad Works, at Denver, was practically destroyed by fire Feb. 13, when damage in the neighborhood of $200,000 was done.

Trade Notes:—

In addition to the six seven-ton cranes which the American Machinery & Supply Co. is to furnish for the Lorain plant of the American Ship Building Co., it has the contract for one 15-ton, 56-foot span, crane with five auxiliary hoists for the Johnson & Jennings foundry, Cleveland.

The contract for a large tonnage of structural steel work to be used in connection with the new plant of the New York State Steel Co., Buffalo, has been let to Wm. B. Scaife & Sons Co., Pittsburg. The Forest City Steel & Iron Co., Cleveland, also has a contract for about $50,000 worth of structural materials for the blooming mill and soaking pits.

The Toledo-Massillon Bridge Co. will furnish the structural iron work for the new 12-story Ohio building at Toledo.

The Brown-Ketcham Iron Works, Indianapolis, has been awarded the contract for seven new street sheds for the new wharf system at New Orleans, the contract involving about $175,000.

Four ship loads of agricultural machinery are soon to be started for southern Russia markets by the International Harvester Co. These with other exportations to be made in the near future represent a value of about $2,500,000.

Tate, Jones & Co., Inc., of Pittsburg, have received an order from the General Electric Co., to equip the company's fourth 20-ton open-hearth furnace at Lynn, Mass.

The Lockhart Iron & Steel Co., McKees Rocks, Pa., is to install at its new plant 12- and 16-inch bar mills furnished by the Mesta Machine Co., Pittsburg.

The Maryland Steel Co. is soon to replace four of the six blowing engines now supplying blast for its furnaces. These were designed by the Southwark Foundry & Machine Co., Philadelphia, which is building two in its works, the other two being built at the shops of the steel company.

TRADE PUBLICATIONS.

United Engineering & Foundry Co., Pittsburg, has issued a catalog describing the roll turning lathe with automatic change speed gear. Incorporated in the book is a long list of users of this machine.

A. W. Harris Oil Co., Providence, R. I., in a neat catalog, describes the line of oils manufactured by it. These include engine oils, valve oils, cylinder oils, oils for use with superheated steam, gas engine oils, etc.

C. W. Hunt Co., 45 Broadway, New York, issued a small pamphlet entitled, "An Introduction to the General Line of Machinery Manufactured by The C. W. Hunt Co." This machinery includes steeple towers, parabolic towers, unloading towers, elevators, steam shovels, coal-crackers, coal-tubs, blocks, sheaves, rope, automatic railways, hoisting engines.

NEW CALENDAR.

Homer Bowes, Allegheny, Pa., dealer in I beams, machinery, scrap iron, pipe, rails, boilers, engines, etc., has gotten out a calendar, at the top of which there is a colored illustration representing the construction gang on the Union Pacific road defending themselves from the Indians. The illustration is entitled, "Pioneer Railroading." On the lower portion of the card, there is a very small calendar pad.